MAY 1958

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American Cyanamid triples bagging rate with vacuum packer... page 156

...plus many more "how they do it" reports for the processor... page 6

CHEMICAL PROCESSING

POLYETHYLENE PLANNERS

Bakelite's Benedito, Turner, and Glenn
—top team behind expansion to Ziegler and Phillips linear plastic . . . . . page 42

e copy

General Chemical announces its THIRD HF PLANT!

Now Nitro, W. Va. ③

① MARCUS HOOK, PA.

Make General Chemical your HQ for HF!

② BATON ROUGE, LA.

Construction is now underway for General Chemical's third hydrofluoric acid plant. Producing both aqueous and anhydrous acid, it will augment the company's already extensive HF capacity at Baton Rouge, La., and Marcus Hook, Pa.—and assure ample reserves to meet industry's needs for the foreseeable future.

Your Most Dependable Source of Supply for HF

General Chemical is the *only* supplier offering shipment from more than one producing location. In addition, it has five HF stock points at Buffalo, N. Y., Chicago, Ill., Cleveland, O., El Segundo, Calif. (Los Angeles), and Pittsburgh, Pa.

Also important to you is General Chemical's integrated raw materials position—your best protection against interruptions of supply. General owns and operates its own fluorspar mines and mills, and sulfuric acid plants. These, together with multiple, high-capacity HF plants, plus strict quality control all along the line, make *General* your most dependable source of supply for hydrofluoric acid.

First For Fluorine Chemicals

GENERAL CHEMICAL DIVISION

40 Rector Street, New York 6, N. Y.

Allied Chemical

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland (Miss.) • Cleveland (Ohio) • Denver Detroit • Houston • Jacksonville • Kalamazoo • Los Angeles • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • Portland (Ore.) • Providence San Francisco • St. Louis • Seattle • Kennewick, Vancouver and Yakima (Wash.) **In Canada: The Nichols Chemical Co., Ltd. • Montreal • Toronto • Vancouver**

Check 4921 opposite last page

that's interesting

In the can

Pressurized food products are expected to become an increasingly important commodity. Syrups, spreads, sauces, toppings, and similar items will add to the trend toward pressurized foods. Robert Hollister of American Can Co. forecasts that aerosol cans for paint, insecticides, shaving lather, and deodorants may each pass the 50-million-cans-a-year mark in 1958 and that hair spray can production may reach 100-million figure.

The growing aerosol family

Tires in pastels

A new chemical has joined the approximately 1400 that go into tire production. The addition is a silica pigment that makes possible the production of rubber compounds that can be tinted to virtually any color and still retain regular wearing qualities. (*Chemical News*, Manufacturing Chemists' Association)

Life in space

The sanitary engineer, far from being the local plumber, is the man who can keep the space traveler breathing. Engineer-scientists equipped to handle air pollution, waste treatment, and other problems, will be of vital importance to

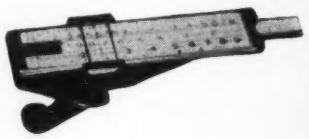
men in space suits. Programs in sanitation engineering, which include courses covering fields from water and air pollution to disposal of radioactive wastes, are being offered by technological institutions such as the Illinois Institute of Technology.

Another 'space' problem

Conservation of weight, maintaining an atmosphere of air suitable for sustaining life, and providing at least reasonable comfort for occupants are problems facing designers of outer space missiles and ships. Barnebey-Cheney activated charcoal, already proven in atomic submarines, will play a key role in removing from the ships atmosphere all vapor contaminants due to human occupancy, propulsion and control equipment as well as toxic gases.

Small-size slip stick

An inter-company symbol or "trade mark" for engineers, researchers, or other scientists is now available. Resulting



from a management clinic discussion to decide on a universally accepted achievement or departmental award, this less-than-two-inch slide rule is so realistically detailed that it appears to be fully operational. Designed by and obtainable from Document House of Greenwich, Conn.

Warning to rocketeers

"Remember chemicals, like a shotgun or a butcher knife, are safe if handled properly; potentially lethal if they are not." This is the warning the Manufacturing Chemists' As-

To page 5

specialization assures a finer product

FLOWLINE

WELDING FITTINGS

Stainless Steels · Monel · Nickel · Aluminum

. . . made by specialists in corrosion-resistant metals

FLOWLINE fittings are engineered down to the last detail . . . and made, with almost watchmaker precision, by specialists in corrosion-resistant metals. The exclusive method used comprises a series of cold-working operations with intermittent anneals—a process which puts the metal in the best condition for corrosion resistance. The mechanical specifications of FLOWLINE fittings exceed requirements of applicable A.S.T.M., A.S.A., and M.S.S. codes—giving you plus values at no extra cost.

Make your corrosion piping light, tight, safe, strong. Butt weld straight-cut pipe to FLOWLINE fittings . . . tees, ells, reducers, stub ends, caps. Available from stock through leading distributors. Made in sizes ⅛" through 12"—Schedules 5S, 10S, 40S, 80S—Stainless Types 304, 304L, 316, 316L, 347, 348; Monel, Nickel, and Aluminum.

FLOWLINE 237" WALL 304L

cost no more than ordinary fittings

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NEW CASTLE, PENNSYLVANIA
World's Largest Manufacturer of Stainless Welding Fittings

Check 4922 opposite last page

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CHEMICAL PROCESSING

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

For the management team

Vol. 21 May 1958 No. 5

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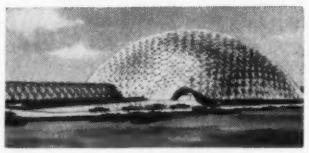
From page 3

sociation has issued to amateur rocketeers. Three rules for conduct:

1. Don't experiment with potentially hazardous materials unless you are completely familiar with safe procedures.
2. Don't attempt to launch home-made missiles unless the launching takes place under competent supervision.
3. If you are a student, check your idea with your science instructor before you attempt the experiment.

Bigger than a football field

Geodesic design will result in what is probably the world's largest circular building without internal supports. Union Tank Car Co. is building the "Union Dome" which will enclose 110,000 sq ft of floor area. The dome, fabricated from ⅛" steel sheet and 4" tubing, will provide economy in cost per square foot of area covered, unimpeded materials and work flow, and visual control of all working areas. Estimated cost, over $1 million. Dome was designed by Synergetics, Inc. of Raleigh, North Carolina.

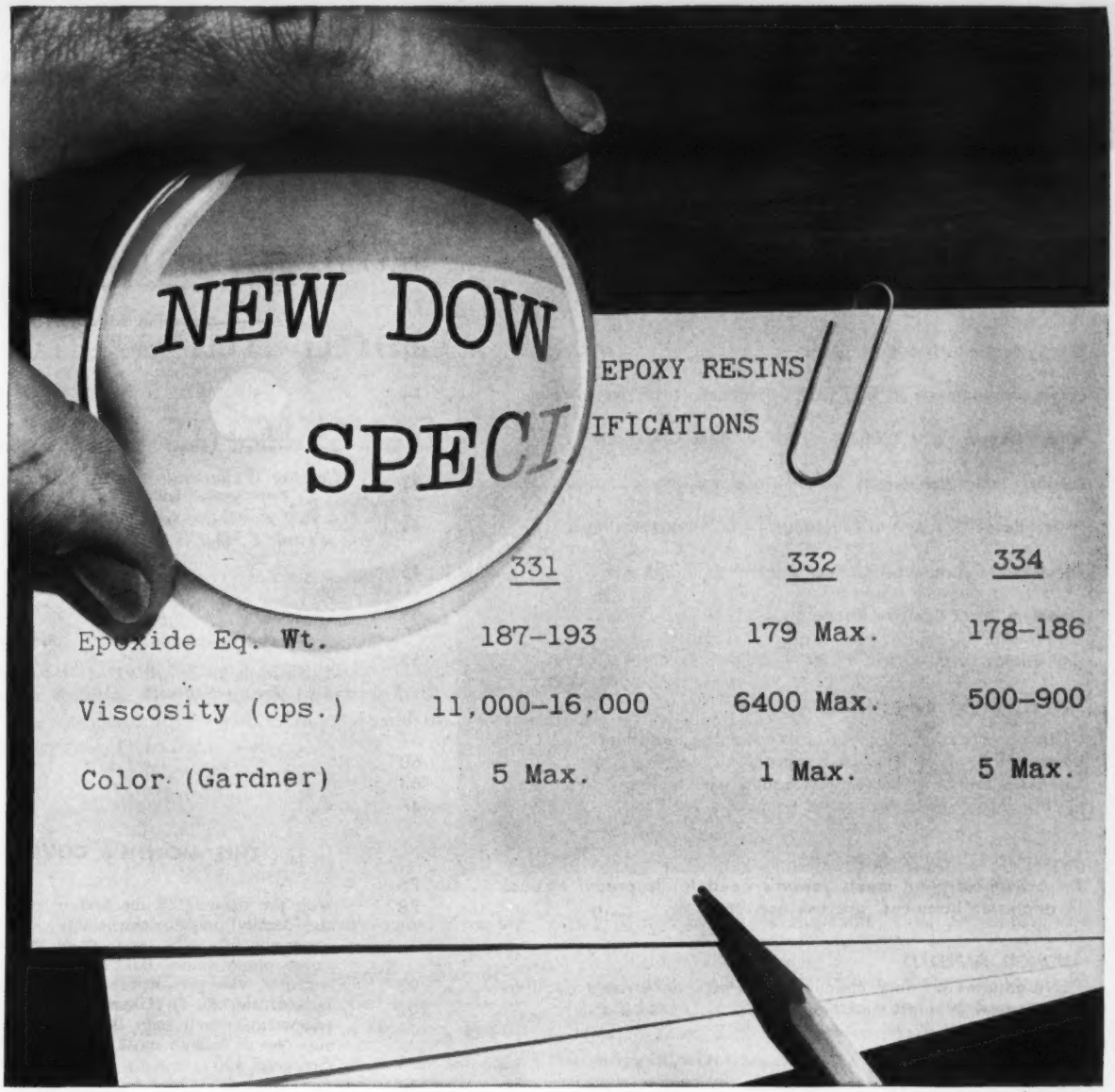


Union Tank Car's "Union Dome"

Pigs acting like pigs

Saccharin is helping pigs make hogs of themselves. Experiments on 600 young pigs at Iowa State College have shown that just one pound of the compound per ton of ration makes the little fellows eat — like hogs. Weight gain was more than that achieved with sugar or any combination of saccharin and sugar.

More "That's Interesting" items are on pages 13, 86, 165, 178.



New Dow epoxies feature "lens clear" liquid resin

Dramatic evidence of the striking clarity and purity of Dow Epoxy Resin 332—unique member of Dow's new line of liquid epoxy resins—is shown in the illustration above. The magnifying lens was actually cast from this new water-clear resin. In addition to improved clarity and uniformity, DER 332 has very low viscosity, longer pot life and greater heat resistance than conventional epoxies.

Also available, for formulations where absolute purity is not so important, are Dow Liquid Epoxy Resins 331 and 334.

Dow's position as a basic producer of all epoxy raw materials assures top quality control and a narrower range of specifications. It will also enable Dow to introduce, in the near future, a complete line of solid epoxy resins and a new line of polyfunctional liquid epoxy resins outstanding in high temperature service.

Prompt delivery of these three Dow Liquid Epoxy Resins can be made in drums, truck or tank car lots. For more information contact your nearest Dow sales office or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Dept. 2259Q.

EPOXY

YOU CAN DEPEND ON DOW

Check 4924 opposite last page

chemical processing

highlights

May 1958 volume 21 number 5

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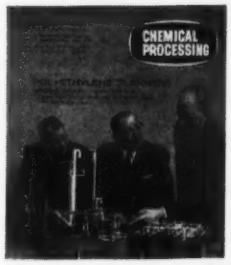
THIS MONTH'S COVER

With the opening of the first of its two new high-density polyethylene plants, Carbide becomes the fifth U.S. producer of the material. Cover photo shows Bakelite Division's J. D. Benedito, vice president-sales, president R. K. Turner, and R. D. Glenn, vice president-development, who'll map the company's course into one of today's most competitive markets. (See page 42.)



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over the editor's shoulder

Education —whose job?

In this issue, pages 44 and 46, Nobel Laureate Dr. Harold C. Urey and Rear Admiral H. G. Rickover, father of the atomic-powered submarine, point to ways of improving education in this country.

They emphasize that children should be given a primary-school start in subjects normally considered high-school material — foreign languages and higher mathematics, for example. They stress the importance of recognizing "gifted" children early and of giving them work that will truly exercise their abilities.

Both agree that there must be a standard examination — regional or national — to test how well teachers are teaching and students are learning subject material.

We are aware that teacher salaries are shamefully low, classrooms are overcrowded (no doubt a cause and effect). Money is needed for salaries that will attract and hold teachers. Money is needed for physical facilities.

What concerns us is the eagerness with which so many are turning to Pandora's Box of federal-government aid as the solution. Can't this — *shouldn't* this — be solved by individuals, businessmen, and public officials on the local or state level?

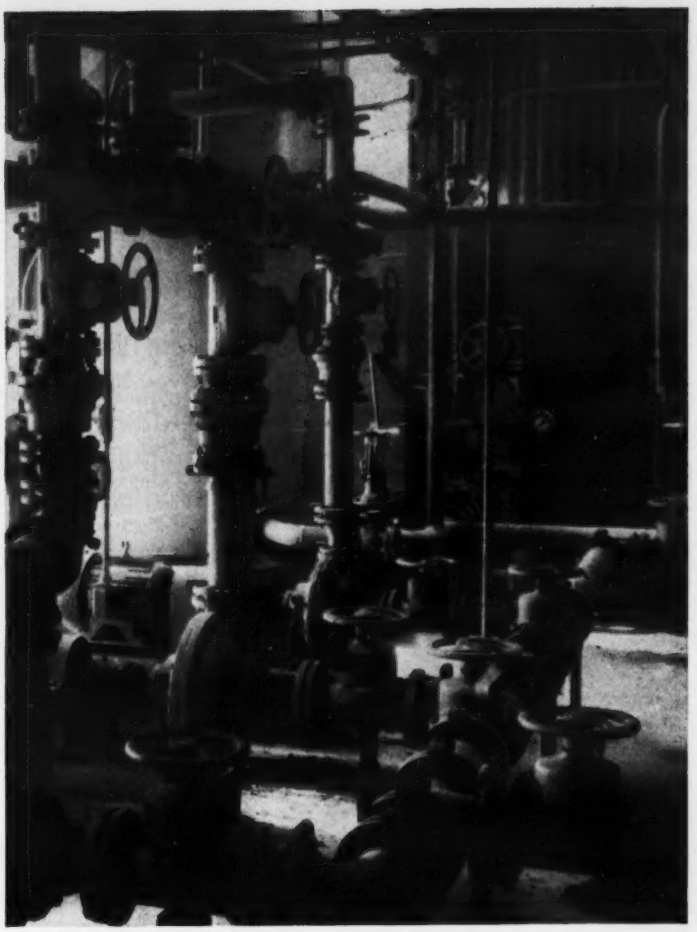
In some localities, businessmen have stepped in to help local school officials, often in planning and partially financing programs for better science teaching. But these examples are spotty.

There's no doubt that our education will be improved. The big questions are who *will* . . . and who *should* . . . do the job. The answers to these two questions unfortunately may not be the same.

Dana B. Berg

Managing Editor

Maintaining maximum flow in serum lines with minimum pressure drop



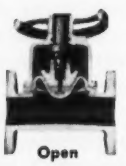
Goodyear Tire & Rubber Company reports no valve clogging or interruption to flow in handling viscous fluids — with Grinnell-Saunders Straightway Diaphragm Valves.

Grinnell-Saunders Straightway Valves are now in use on serum lines of the Goodyear Tire & Rubber Company. Serum is a suspension of rubber particles in an acid brine solution. The installation pictured above is in Goodyear's Synthetic Rubber plant at Houston, Texas.

Grinnell-Saunders Straightway Valves were selected for this service because of their straight-through design. Material in process cannot build up and choke off flow because there are no pockets or gate trenches to trap solids. The straight-through feature also assures speed, ease and economy of rodding out, when necessary. When a diaphragm must be replaced — that job, too, can be done quickly, without removing the valve body from the line.

Isolation of operating parts from the fluid stream is still another important advantage of the Grinnell valve . . . eliminating corrosion and clogging of the valve mechanism while, at the same time, preventing contamination of product in the line.

Grinnell-Saunders Diaphragm Valves are available in a wide range of body, lining, and diaphragm materials to meet different service conditions. To secure further information, contact the Grinnell branch office nearest you — or write directly to Grinnell Company, Inc., 277 West Exchange Street, Providence, R. I.



Open

Diaphragm lifts high for streamlined flow in either direction. No irregular surface to trap deposits.

Closed

Diaphragm presses tight for positive closure, even when handling viscous or fibrous materials.

GRINNELL-SAUNDERS DIAPHRAGM VALVES

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
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Check 4925 opposite last page

Stacked in long rows on the shelves of a Dicalite laboratory, tagged and dated paper sacks like these are important to *your* processing. For they are an essential part of the extremely rigid quality-control system in every Dicalite plant... composite samples taken periodically during processing for the tests which insure Dicalite's unvarying dependability. These tests—more than 20,000 of them every month—may cover a wide range; weight or specific gravity, cake density, brightness, oil absorption, flow-rate, particle size range and distribution, moisture content or other properties, depending upon the type of Dicalite product. No other mineral processed into powder form is so closely quality-controlled.

Laborious? Time-consuming? Certainly, but the only known way of producing, continuously, diatomaceous products which meet the Dicalite quality standards, admittedly the highest in the industry. And very often we are pleased to hear from customers, volunteering the information that their own independent tests confirm the fact that Dicalite products do conform to the highest standards... dependable, uniform, each lot just like all those before. This dependably uniform quality is the prime reason why many exacting firms have standardized on Dicalite filteraids or filler materials. We believe that your processing, too, will benefit with Dicalite. Investigate—write us today for information on how Dicalite can serve you.

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DICALITE DEPARTMENT
Great Lakes Carbon Corp.
612 South Flower St.
Los Angeles 17, Calif.

Check 4926 opposite last page

conventions and exhibits

May 1-8. American Society of Tool Engineers, 26th Annual Meeting and Tool Show, Philadelphia Convention Center, Philadelphia.

May 6-9. Western Joint Computer Conference, Ambassador Hotel, Los Angeles.

May 8-10. Western Material Handling Show, Great Western Exhibit Center, Los Angeles.

May 11-14. Fluid Controls Institute, Lake Placid Club, Lake Placid, New York.

May 11-15. American Society of Mechanical Engineers, Oil and Gas Power Conference and Exhibit, Bellevue-Stratford Hotel, Philadelphia.

May 12-15. American Petroleum Institute, Division of Refining, 23rd Midyear Meeting, Statler Hotel, Los Angeles.

May 15-16. Operations Research Society of America, Sheraton Plaza Hotel, Boston.

May 19-23. National Fire Protection Association, Annual Meeting, Palmer House, Chicago.

May 26-28. The Chemical Institute of Canada, 41st Annual Conference and Exhibition, Royal York Hotel, Toronto, Ontario.

May 26-28. Synthetic Organic Chemical Manufacturers Association, Annual Outing, Shawnee Inn, Shawnee, Pa.

May 26-30. American Management Association, National Packaging Exposition, Coliseum, New York.

May 31-*June* 8. ACHEMA 1958, 12th Chemical Engineering Exhibition and Congress, Frankfurt am Main, Germany.

June 1-6. Ninth Annual Industrial Research Conference, Columbia University, New York.

...Meetings and shows of interest to the chemical industries

June 2-6. American Society for Testing Materials, Sixth Annual Meeting on Mass Spectrometry, Jung Hotel, New Orleans.

June 5-6. Commercial Chemical Development Association, Niagara Hotel, Niagara Falls, New York.

June 9-11. American Association of Spectrographers, Ninth Annual Symposium on Spectroscopy, Pick-Congress Hotel, Chicago.

June 9-12. National Materials Handling Exposition, Public Auditorium, Cleveland.

June 9-13. Fourth International Automation Congress and Exposition, Coliseum, New York.

June 10. Synthetic Organic Chemical Manufacturers Assn., luncheon meeting, Hotel Roosevelt, New York.

June 12-14. Manufacturing Chemists' Association, 86th Annual Meeting, The Greenbrier, White Sulphur Springs, West Va.

June 14-16. American Society for Testing Materials, Hotel Statler, Boston.

June 15-19. American Society of Mechanical Engineers, Semiannual Meeting, Statler Hotel, Detroit.

June 22-27. American Institute of Chemical Engineers, 50th Anniversary Meeting, Bellevue-Stratford Hotel, Philadelphia.

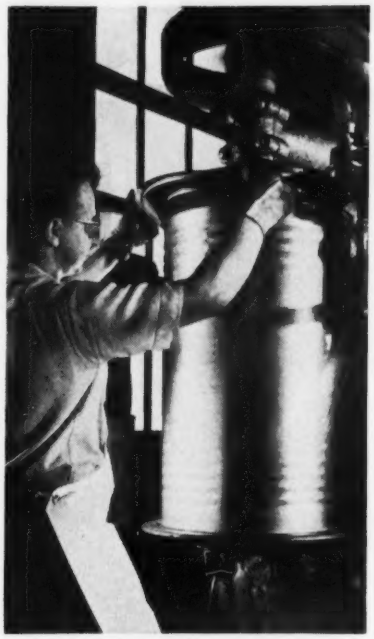
June 23-25. American Society of Heating and Air-Conditioning Engineers and The American Society of Refrigerating Engineers, Joint Meeting, Hotel Leamington, Minneapolis.

August 11-13. Western Packaging & Materials Handling Exposition, Civic Auditorium, San Francisco.

September 9-12. Tenth National Chemical Exposition, International Amphitheatre, Chicago.

BRIEFS for buyers of

Caustic Potash
Phosphorous Acid
Sulfur Chlorides
Cl_2 Wall Chart



Caustic potash—why the package is important

Expose it to air and solid caustic potash soaks up moisture and carbon dioxide swiftly, making the chemical weak and slow acting.

To help you avoid this and to protect the inherent purity of Nialk® caustic potash, we make our own containers to our own rigid specifications.

You can get this exceptionally pure anhydrous caustic potash in any of seven forms at 90% strength or in flake or solid form at 85%. Or you can order the liquid form in strengths from 45% to 52%.

Check the coupon for more complete information.

H_3PO_3

what *can't* you do with it?

Reducing agent, catalyst, plating assistant, intermediate—there's almost no end, it seems, to the tasks you can tackle with *phosphorous acid*, H_3PO_3.

Produced in glass equipment, this Oldbury® product comes to you as a 70% clear water-white aqueous solution, or as a white crystalline flake assaying 97% min., deliquescent and very soluble in water.

We're uncommonly proud of the flake form, which is presently saving one of our customers $45,000 a year in processing costs.

A strong dibasic acid, H_3PO_3 goes into phosphite salts used as plasticizers. It can serve as a catalyst in ether formation, and, possibly alone or with other catalysts, in cross polymerization of olefins and in alkylation of aromatics.

You can use it to deposit nickel and cobalt phosphides in plating; and to prepare dialkyl phosphites.

Are you planning any of these operations? If you feel that H_3PO_3 might ease a problem, use the coupon to request specifications and typical properties. Better still, write us on your business letterhead for a sample.

Sulfur chlorides—*mono-* or *di-*?

Is there an advantage to using a sulfur *mono*chloride and chlorine mixture in place of sulfur *di*chloride?

Yes.

You can purify the *mono-* by simple distillation should you want to. And you can store *mono-* for long periods without gas pressure developing in the container.

Will *mono-* do what *di-* will do? Yes, usually. Actually, you can consider sulfur *di*chloride as a mixture of sulfur *mono*chloride and chlorine.

Naturally, we'll be happy to sell you either the *mono-* or the *di-* as well as our other chlorinating agents, chlorine, sulfuryl chloride, thionyl chloride, and muriatic acid.

Our bulletin on some of these chemicals, *Hooker Chlorinating Agents*, is offered in the coupon. Also available are our technical data sheets on two other chlorinating agents, phosphorus trichloride and phosphorus pentachloride.

New wall chart

helps you handle chlorine safely

A useful addition to your plant safety program is this new Hooker chlorine wall chart.

It can help prevent accidents by showing your employees the most important do's and don't's for handling chlorine. In concise, easily understood language, it explains the operation of tank car, ton container, and cylinder valves; describes safe storage methods; and tells what to do in an emergency.

If you'd like a copy of the chart for posting, ask your Hooker salesman or check the coupon.

For more information on chemicals mentioned on this page, check here. When requesting samples, please use business letterhead.

- ☐ Caustic Potash
- ☐ Chlorine Wall Chart
- ☐ Chlorinating Agents, Bul. 328-A
- ☐ Sulfur Monochloride
- ☐ Sulfur Dichloride
- ☐ Phosphorous Acid
- ☐ Phosphorus Trichloride
- ☐ Phosphorus Pentachloride

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HOOKER CHEMICALS PLASTICS

Check 4927 opposite last page

letters from readers

More on Tariffs

Gentlemen:

It was a pleasure to read in your January issue (page 12) the effective rebuttal presented by Mr. Miller to the tariff protection idea. The development of healthy competition and close economic ties is as essential to our future economic welfare as it is to world peace.

It seems to me that there is one further important aspect of the trade situation which deserves consideration. We have no real guarantee that if we discourage imports we will always retain our present favorable balance of trade. We are already well on the way to developing a domestic price structure higher than the world market, though the results of such a condition have been temporarily avoided by the great demand for our capital goods, and our generosity in providing others with the funds to buy them.

The foreseeable end to this road is exemplified by the present agricultural commodity situation. Our farm policy has caused many products to be priced well above the prevailing world prices, and as a result we are forced to rely in part on government "deals" to dispose of them, with the tax-

"That fresh chemical engineer won't trouble us anymore. I made a clerical error that transferred him to Brazil."

In Iron Body Wedge Gate Valves, Outside Screw and Yoke Design,

Walworth offers you these 8 outstanding advantages!

STRONGER CONNECTIONS. T-head disc-to-stem connection on OS&Y types permits wedge to properly seat itself.

TIGHTER SEAL. Solid web type disc on OS&Y valves provides tight closure, greater strength and longer service.

REDUCED TURBULENCE. Fluid action is minimized due to this straight flow port design.

FEWER OBSTRUCTIONS. Seat rings of bottom seated types are screwed into body to prevent gum and grit accumulations.

*WALWORTH is a registered trademark of WALWORTH COMPANY

Walworth Subsidiaries: ALLOY STEEL PRODUCTS CO. • CONOFLOW CORPORATION • GROVE VALVE AND REGULATOR CO

payer making up the difference.

The prospect of other major sections of our economy moving into a like state is sad to contemplate, and is reminiscent of the present state of Great Britain resulting in part from the diminution of the Commonwealth markets due to local industrialization. If we do not get our feet on the ground soon the Russians, Germans, and Japanese are going to have a head start that it will be hard to make up. This to my mind is one of the major disadvantages to our "creeping inflation," and apparently it has received little consideration.

This whole matter is obviously of vital concern to all Americans, and more especially to engineers as the "architects" of industry. Someone has got to make himself heard above the din of grinding axes in Washington. Our competitors are making tremendous sacrifices in living standards to better their trade position. Is American management and labor going to ignore the problem? If so the reckoning is likely to be painful to us all.

GRAHAM B. KNIGHT
Winchester, Mass.

YOUR OPINIONS —

— and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We welcome your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions. By publishing your letters in CHEMICAL PROCESSING others will have the opportunity to hear your side.

Perhaps you agree

With what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed. If so, why not let us and others hear your ideas? Suitable letters will be published in these regular "Letters from Readers" columns. Address your comments to: The Editor, CHEMICAL PROCESSING, 111 E. Delaware Place, Chicago 11, Illinois

SURE-GRIP HANDWHEEL. Fluted design assures a sure grip, even with greasy gloves.

HIGH CORROSION RESISTANCE. Brass liner protects glands from deterioration and scoring.

EASIER REPACKING. Hinged gland eye bolts on OS&Y valves permit fast maintenance under full pressure.

LESS DAMAGE. Bronze back seat bushing in bonnet of OS&Y valves prevents scoring, guides stem accurately.

Walworth Iron Body Gate Valves are available with screwed or flanged ends, in sizes and types for every purpose.
For full information see your Walworth Distributor or write:
Walworth Company, 60 East 42nd Street, New York 17, N. Y.

WALWORTH*

DISTRIBUTORS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

M & H VALVE & FITTINGS CO. • SOUTHWEST FABRICATING AND WELDING CO., INC. • WALWORTH COMPANY OF CANADA, LTD.

Check 4928 opposite last page

News about

B.F.Goodrich Chemical *raw materials*

Sanford station of Florida Power & Light Company uses Geon conduit furnished by Hughes Supply of Daytona Beach. B.F.Goodrich Chemical Company supplies the Geon polyvinyl material only.

corrosion problem knocked out . . .

generating station gets conduit of Geon

YEARS from now pulling new cable through this conduit made from Geon polyvinyl materials will be just as easy as it is today. Unlike ordinary steel conduit, Geon conduit resists the corrosive effect of salt water, gases, chemicals and acid or alkaline soils. Internal and external surfaces stay smooth—like new.

Conduit or pipe made from Geon offers high tensile or impact strength. It stands up under pressure . . . is not subject to galvanic corrosion. It resists sunlight, fungi, bacteria, moisture, heat and cold. And its light weight makes installation especially easy.

Engineers are taking advantage of properties of pipe and conduit of Geon in a wide variety of applications. For information, write Dept. LJ-5, B.F.Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich

GEON polyvinyl materials • HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

Check 4929 opposite last page

LETTERS

Orchids to Dr. Martin

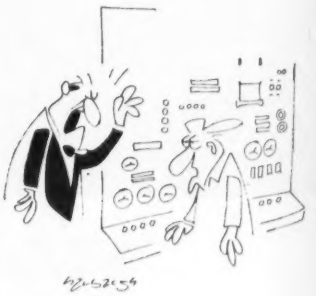
DEAR EDITOR:

In the December 1957 issue of CHEMICAL PROCESSING, I read an article by Dr. Gustav J. Martin, Vice President and Research Director of the National Drug Company (*Creativity and Survival*, page 27). You asked for the views of your readers, and I should like to express mine.

This short and incisive article was one of the finest analyses of american science that I have ever read. It is a rare individual who is able to place his own field in the proper perspective of life as a whole. Dr. Martin has not only done this, but clearly demonstrated the unity of the physical and biological sciences with the science of man himself. His recognition of technological development as an evolutionary phenomenon, and not really true creativity is extremely gratifying to me, for too much social value has been set upon the "marketing orientation," and not enough on true *productivity*. Man has to some extent become the slave of the very machines he invented to lessen his work.

Thanks for publishing such an honest and courageous article, and congratulations to Dr. Martin!

PAUL B. VENUTO
Columbian Carbon Co.
New York City



". . . And remember . . . you'll be controlling our whole operation, I'm making you responsible . . . oh, skip it!"

THAT'S INTERESTING

'Mr. Nose'

A good perfumer has to have an odor memory for nearly 3000 aromatic chemicals and natural materials. Ernest Shiftan, VP and Chief Perfumer for van Ameringen-Haebler, indicated that a perfumer must have imagination and skill to be able to create a blend of as many as 300 of these materials to make a finished product.

Power boost

Latest potent additive offered for internal combustion fuel is an organic manganese compound. It adds 20% to power output of airplane motors, supplementing tetraethyl lead. (*Chemical Digest*, Foster D. Snell)

Dust dodger

Dusty venetian blinds should become less of a problem. A transparent film containing colloidal silica makes blinds too slippery to catch dust.

For more information on product at right, specify 4930 see information request blank opposite last page.

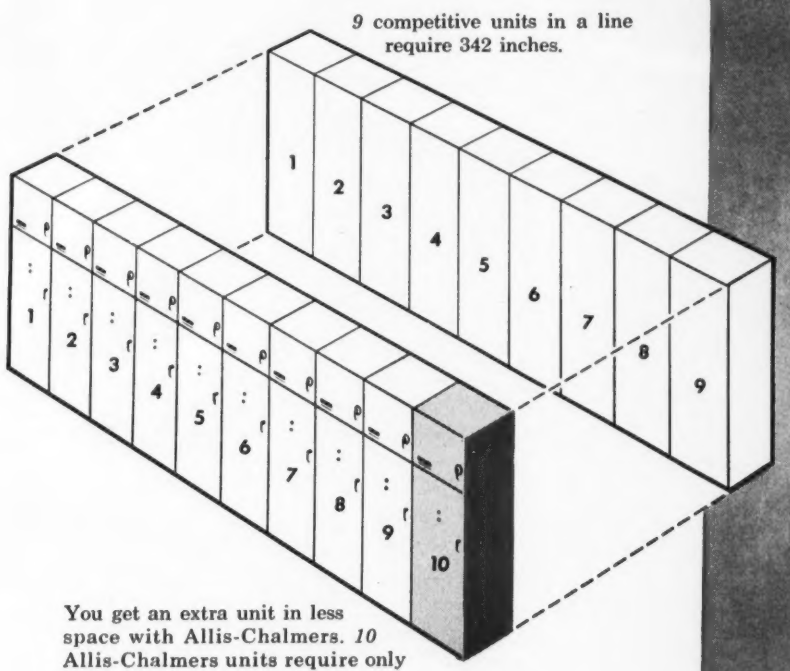
Newly designed
Type H Motor Control

Saves valuable plant space

Newly designed Allis-Chalmers high voltage control units are only 34 inches wide. This means you can put 10 Allis-Chalmers cabinets in less space than required by 9 competitive 38-inch units. In addition, the narrower width means less space required for door swing. Result: You save a total of 2.36 sq ft of floor space per unit. On 10 units, this means a saving of 23.6 sq ft.

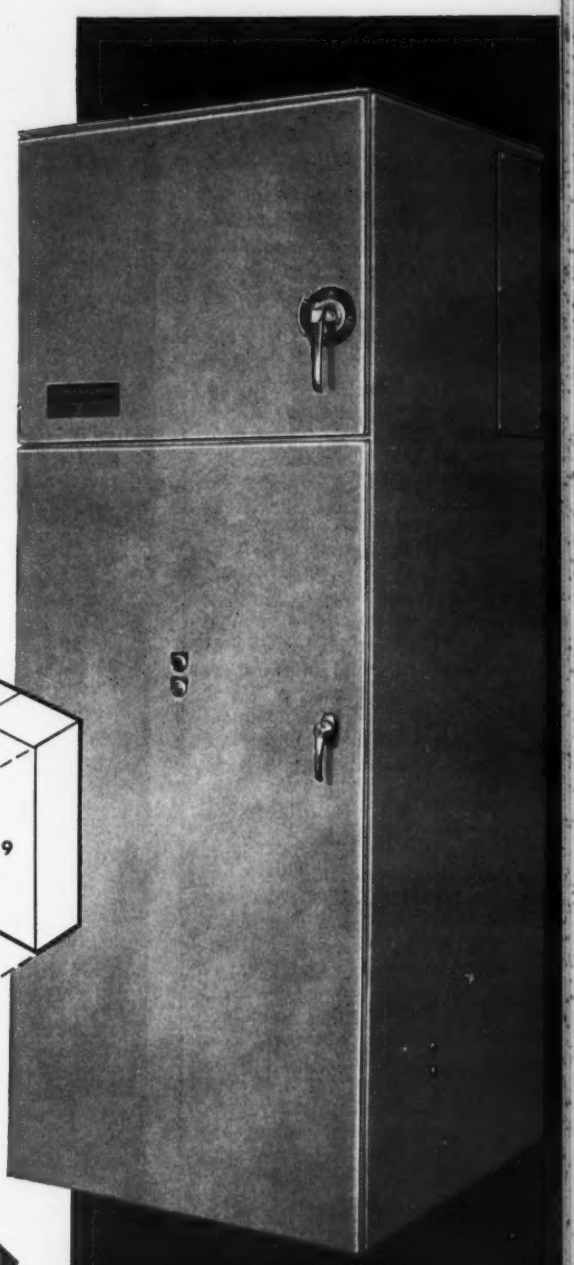
Smaller size is only one of many advantages in this new Allis-Chalmers design. You also get full-front access, more room for optional features, a completely tested unit, and the ultimate in protection for men and machines.

For more information on how this new control design can help you, call your nearest Allis-Chalmers representative, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



9 competitive units in a line require 342 inches.

You get an extra unit in less space with Allis-Chalmers. *10* Allis-Chalmers units require only 340 inches.



ALLIS-CHALMERS A-5518

DEAR SIR:

We found the article (*Creativity and Survival,* December CHEMICAL PROCESSING, page 20) very thought provoking. This matter of stimulating creativity (if this is possible) calls for, I believe, establishing incentives for our youth, proper guidance rather than stifling the enthusiastic and imaginative mind and increasing the teacher to pupil ratio in order to extend each individual to full capacity. I believe we have been gaging our curriculum to the mediocre too long.

L. K. BUSTAD

Dept. of Physiology and Biophysics, School of Medicine
University of Washington
Seattle 5, Washington

Chemical distributors

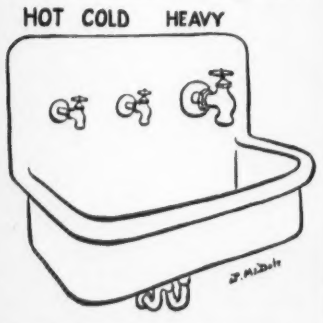
Dear Sir:

We are enclosing a copy of a recent address given by Robert Smock Thompson, President of Thompson-Hayward Chemical Company, to the Midwest Chemical Salesmen's Club.

It is very interesting to note the parallel in opinion of Mr. Thompson and Mr. J. K. Watkins in Mr. Watkins' article, "The Distributors Place in Modern Chemical Marketing," in your March issue, p 27.

We are sure that chemical distributors appreciate Mr. Watkins presenting their position so clearly.

PAUL L. LONNECKER
Thompson-Hayward
Chemical Co.
Kansas City, Missouri



STEPHENS

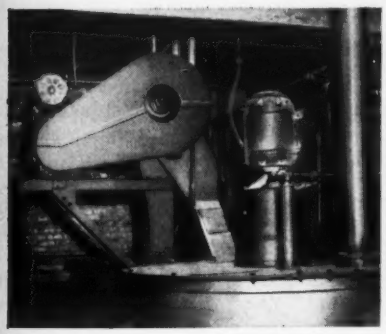
ADAMSON

chemical product conveying systems

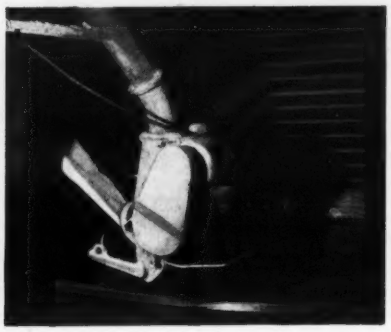
For more than half a century, S-A engineering talent and equipment have been handling the toughest conveying assignments for the vast chemical processing industry. The lessons taught by these years of experience are reflected in sound S-A equipment design and the most expedient approach to every conveying problem.

Stephens-Adamson bulk materials handling systems characteristically conform to highest standards of product protection, speed, safety in operation, and economy of movement. There is the broadest possible line of manufactured conveying products to select from in laying out any material handling system.

Whether it's design and installation of a completely new system or the revision and modernization of an old or inadequate one, S-A can help you save cost on every ton of material you move. Consult the sales engineer in your area. He can show you why it's wise to convey the S-A way.



Closeup view of REDLER head section showing a SACO speed reducer on drive. S-A builds a wide range of power transmission equipment for conveyor use.



Swiveloader insures uniform loading to maximum capacity. S-A builds five basic types of equipment for loading and unloading ships and box cars.

A big chemical processing plant employs REDLER conveyors to carry material completely enclosed and protected. Here material is discharging through pivoting chutes to mixers.

STEPHENS-ADAMSON MFG. CO.

11 RIDGEWAY AVENUE, AURORA, ILLINOIS
LOS ANGELES, CALIFORNIA
BELLEVILLE, ONTARIO

S-A manufactures a wide range of material handling products in three complete plants in the U. S. and Canada.

Belt Conveyors
Belt, Pan & Plate Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage & Reclaiming Systems
"Natural Frequency" Vibrating Conveyors
REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Conveyor Belt Cleaners
Headshaft Holdbacks
Grizzlies & Screens
Centrifugal Pilers
Bin Gates & Tunnel Gates
Car Pullers & Spotters
Bucket Elevators
Skip Hoists
SEALMASTER Ball Bearing Units

• *Write for a bulletin on any of the above products*

Check 4931 opposite last page

looking ahead to next month

Quick previews of some highlights in June Chemical Processing

'Inside' Puerto Rico — new chemical center?

Is the much-talked-about "tax-free" Commonwealth of Puerto Rico as good a spot for chemical business as it's made out to be? Or is it even better? Or worse?

What are the vital facts about labor availability and costs, necessary auxiliary services and repair facilities, local markets, transportation, living and educational conditions and expenses? — those important factors that spell the difference between profit and loss to any business.

To find the answers, associate editor Frank McElroy journeyed over 4000 miles to our sunny island possession. He posed questions to businessmen in the chemical processing industries and to key men in government.

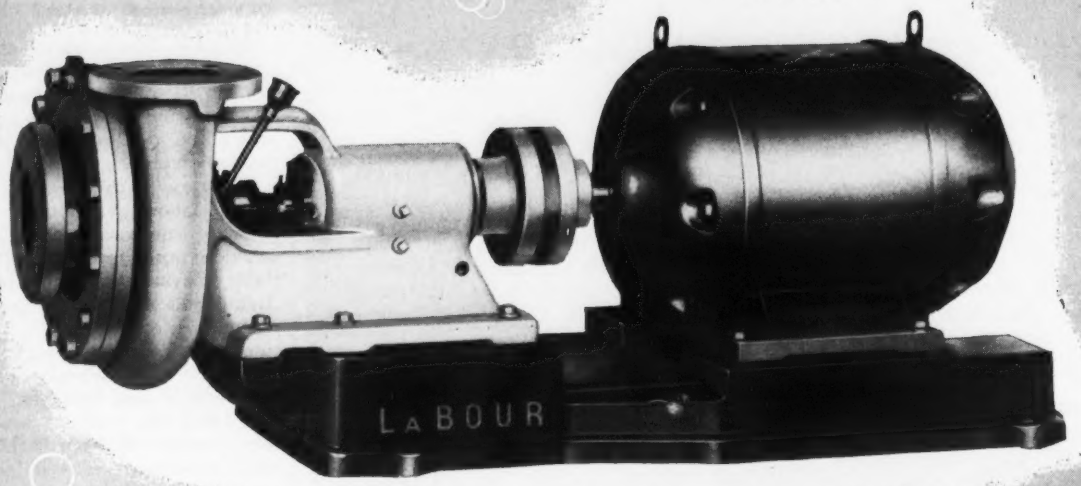
If you or your company are considering an overseas move or thinking of opening a foreign operation, you'll be interested in this "inside story" about Puerto Rico — in next month's CHEMICAL PROCESSING.

The 'organization man' and research

Perhaps one of the most-discussed scientific — and sociological — problems is that of individual initiative. Does our educational system create a man really capable of an inventive or scientific career? Is individual research an anachronism now, replaced by the huge government or corporation research staff? Can group research accomplish as much in terms of real imagination as the lone inventor unhampered by group restrictions?

For some bold and controversial comments on these questions, be sure to see "Individual versus Team Research," by Dr. W. J. Kroll, 1958 Perkin Medal winner, in next month's issue.

when BUBBLES



mean TROUBLES

Aerated solutions and volatile liquids are difficult or impossible to handle with ordinary centrifugal pumps, yet in many operations use of positive displacement pumps just brings on troubles of a different kind. The answer is LaBour Type Q, a non-priming centrifugal with extraordinary ability to handle large amounts of air or vapor mixed with the liquid it pumps.

Occasional "gulps" of air or vapor will not bind a LaBour Type Q. In general, Type Q can rid itself of gases not exceeding 20% of the total volume being pumped. Thus it is suited for many applications which would otherwise require a more costly self-priming unit.

LaBour dependability is of course a feature of this pump, which has only one moving part and no close clearances. If you're having an air or vapor problem, particularly in connection with corrosive liquids, you'd better drop us a line.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 4932 opposite last page

NEXT MONTH

Unloads open-top cars in one minute

When Universal Atlas Cement Co., a subsidiary of US Steel, built a new plant at their Gary, Ind., installation, they wanted a quick method for unloading open-top railroad cars.

A rotary car dumper, which literally locks the car to tracks and upturns it to dump contents, provided them with fast method they sought. One man operates unit, unloading a car in 60 seconds.

Assistant editor George Michael visited the plant and talked to assistant plant manager Gilbert Peterson about the unit's operation. Story appears in June's Material Handling and Packaging section.

Isotopes or machines?

An entirely new field of chemistry may well be coming to the fore — radiation chemistry. Today there are many tools for this work — X-rays, electron beams, isotopes, and direct use of reactors and fuel elements. But the question is: which to use? Each has its own advantages, drawbacks, and economics.

Next month, G. E. Research Lab's Dr. L. G. Cook analyzes the problem from an economic point of view. He presents a detailed economic comparison of the different radiation methods and tells what you can expect to pay for "low-cost" process radiation.

Moisture testing on line

Albert Schwill & Company found that use of a semi-automatic moisture tester allowed them to take the testing operation out of the lab and put it on the production line where it was needed most.

Assistant editor Bill Clarke visited Schwill and talked to Lloyd E. Forsell, plant manager of Schwill's modern malt house, about operation of the unit. His description of the equipment will be in next month's Instrumentation and Laboratory section.

Watching Washington

Preoccupation with ever-popular political punching-bag — the business picture — may force . . .

more important issues to be shelved for this session

Preoccupation with the present business picture by the 85th Congress and the Administration tends to overshadow other issues in spite of their importance. Tax cut talk, unemployment relief and "pump priming" statements echo up and down Washington corridors — much of it with an eye to November elections and succession in 1960 rather than immediate problems.

However, one issue can't — and won't — be sidetracked. The Reciprocal Trade Agreements Act expires June 30.

What its outcome will be is still rather hazy. Opinion is that the act will be extended substantially as requested by the Administration — but not without a hard fight.

Administration's concessions to the opposition should win support. Western Congressmen have been mellowed with the Administration's approval of Tariff Commission recommendation for higher tariffs on imported lead and zinc. Copper interests may get some appeasement. Tariffs on copper imports — slated to start July 1 at 2c per pound whenever the copper price dips below 24c — may be upped to 4c a pound with a below-30c-floor.

The Synthetic Organic Chemical Manufacturers Assn.'s proposal to give Tariff Commission full power over trade subject only to Congress is considered too strong for any action at this session. The proposal got backing from plywood producers and some metals interests. SOCMA also asked for transfer of tariff-reducing authority from the President to the Congress.

For the time being, the MCA has taken a more moderate stand. In a statement presented by Allied Chemical's Richard Hansen, the MCA asked that the present act be extended for two years instead of five with reductions limited to a maximum of five percent each year.

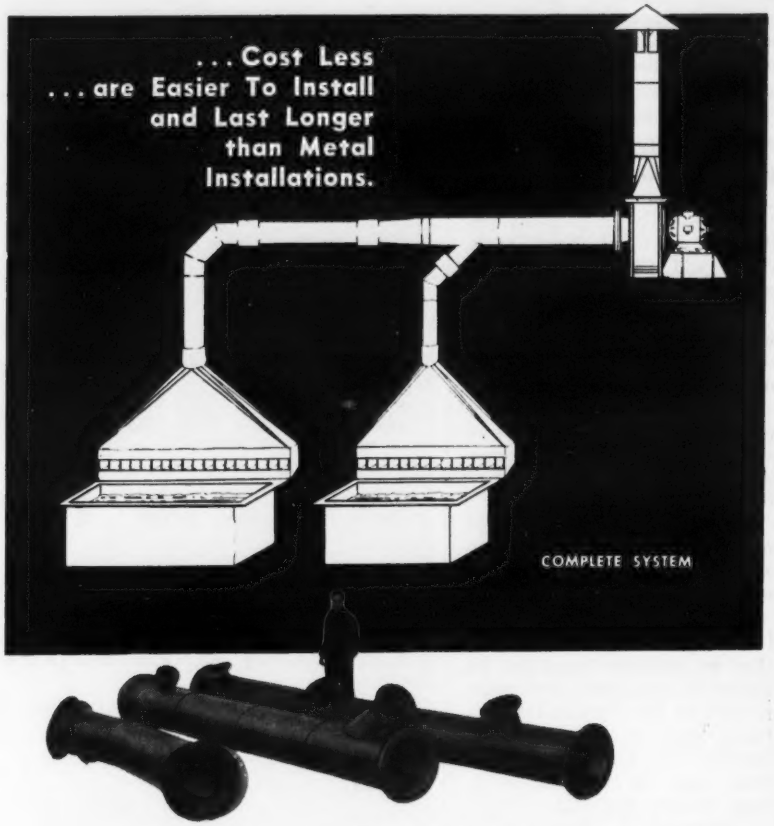
'Minor' gas bill introduced

Declaring that the major natural gas bill is "dead as a doornail," Senator Long of Louisiana has introduced legislation to exempt smaller independent producers of natural gas from Federal regulation. The bill would apply to those producers who sell less than 2-billion cubic feet of gas annually into interstate commerce. According to Long, the smaller producers — although they account for only 10 percent of the production — do make up 90 percent of the producers.

Antitrust doings

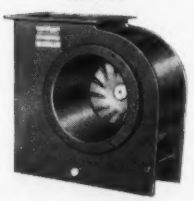
Senator Kefauver has found his yardstick on steel and autos doesn't hold for upcoming anti-monopoly hearings on roofing materials industry — a harbinger of things to come if he looks into other chemical process industries. Because of the diversified nature of the roofing materials industry,

Leakproof Corrosion-Resistant Polyethylene Fume Exhaust And Ventilating Systems And Components



VENTILATING DUCTS

HOODS



VENTILATING FANS

■ American Agile corrosion-resistant fabrications, job engineered to specifications, are light in weight, possess a high impact strength and provide exceptionally long service life.

Prevent hazardous fumes from impairing health and production . . . reduce excessive down-time and replacement costs with a complete system designed to meet your requirements or standard off-the-shelf standard components for installation in your existing system.

Send blueprints of ventilating system for quotation. Write for Free Catalog

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Check 4933 opposite last page

Kefauver's inquiry will deal with selected segments — such as asphalt roofing materials.

In other antitrust moves, Kefauver announced hearings would be held to give enforcement agencies more power in antimerger proceedings. Hearings will also involve premerger notification.

Food additive bills bogged down?

Food additive legislation has bogged down as New York State and City governments move to force Congress' hand.

New York State legislators are considering bills to ban use of new additives until manufacturers can satisfy the state as to their safety. Under present New York law, government inspectors must prove an additive harmful before it may be banned.

The New York City Board of Health is studying proposals for "fundamental changes" in legislation governing use of chemical additives in foods. Change would mean that an additive could not be placed in food until processors proved to the Health Department that it was harmless. Present law holds that additives may be used in foods until proven harmful.

Lawrence A. Coleman of Allied Chemical has urged state legislators to wait until Congress updates the Food Drug and Cosmetic Act of 1938 before taking any action.

Scientists, research and politics

If the precedent-breaking three-day Parliament of Science held here has any long range significance, the scientist you hire tomorrow will be different from today's. Pushed into prominence by scientist shortage, satellites and rockets to the moon, scientists are moving into political and economic areas. Consequently, his thinking will be more oriented toward these areas.

Recommendations from the

EXPERIENCE — Successful completion of the spherical reactor, other new designs and customer projects are the responsibilities of C. S. Brown, Manager of Product Development, (at right) and E. E. Deuring, Director of Product Engineering. They coordinate all phases of mechanical and process activities to *exactly* meet your specific performance requirements.

ENGINEERING
a new look in reactors

Another Glascote first brings you higher pressures and vaporization rates, larger capacity plus superior glass lining

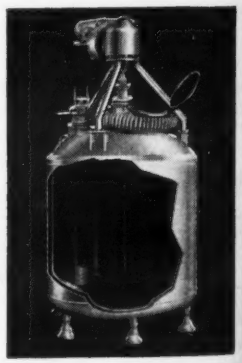
Because of Glascote's long service to the chemical processing industry, they foresaw the need for higher reactor pressures.

Heretofore, reactors could not offer the processing advantages of units capable of operating above the 200 psi ceiling. Glascote engineering accepted the challenge. They went to work . . . came up with tomorrow's design today . . . the first glass-lined spherical reactor.

What will it do? This revolutionary design makes possible internal operating pressures up to 330 psi . . . jacket pressures to 250 psi. *That's 130 psi over any existing reactor!*

This remarkable accomplishment was executed by what we consider the finest creative engineering group in the industry. And they have demonstrated their ability many times . . . by developing these engineering firsts: Rotary mechanical seal, double wall dip tube, welded sealer rings and many others.

Why not tell us about your design, process and application problems. We'll put the same kind of engineering effort and service to work for you.



If your present processing operations do not require higher pressures, you can get the same proven engineering that produced the spherical reactor in Glascote's standard and custom-built line of glass-lined reactors, columns, storage tanks, rotary dryer-blenders, heat exchangers, pipe and fittings and accessory items.

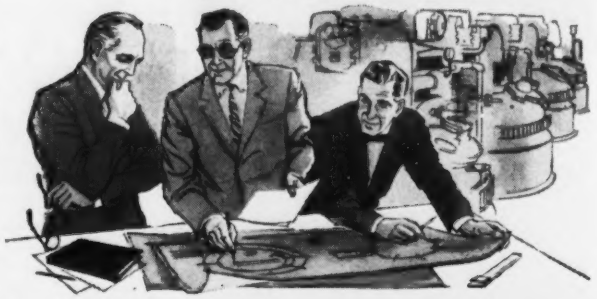
Glascote®
PRODUCTS, INC.
Cleveland 17, Ohio
Sales offices or agents in principal cities, Export sales:
A. O. Smith International S.A., Milwaukee 1, Wis., U.S.A.
A subsidiary of A.O.Smith Corporation
World's largest manufacturer of glass-lined steel products

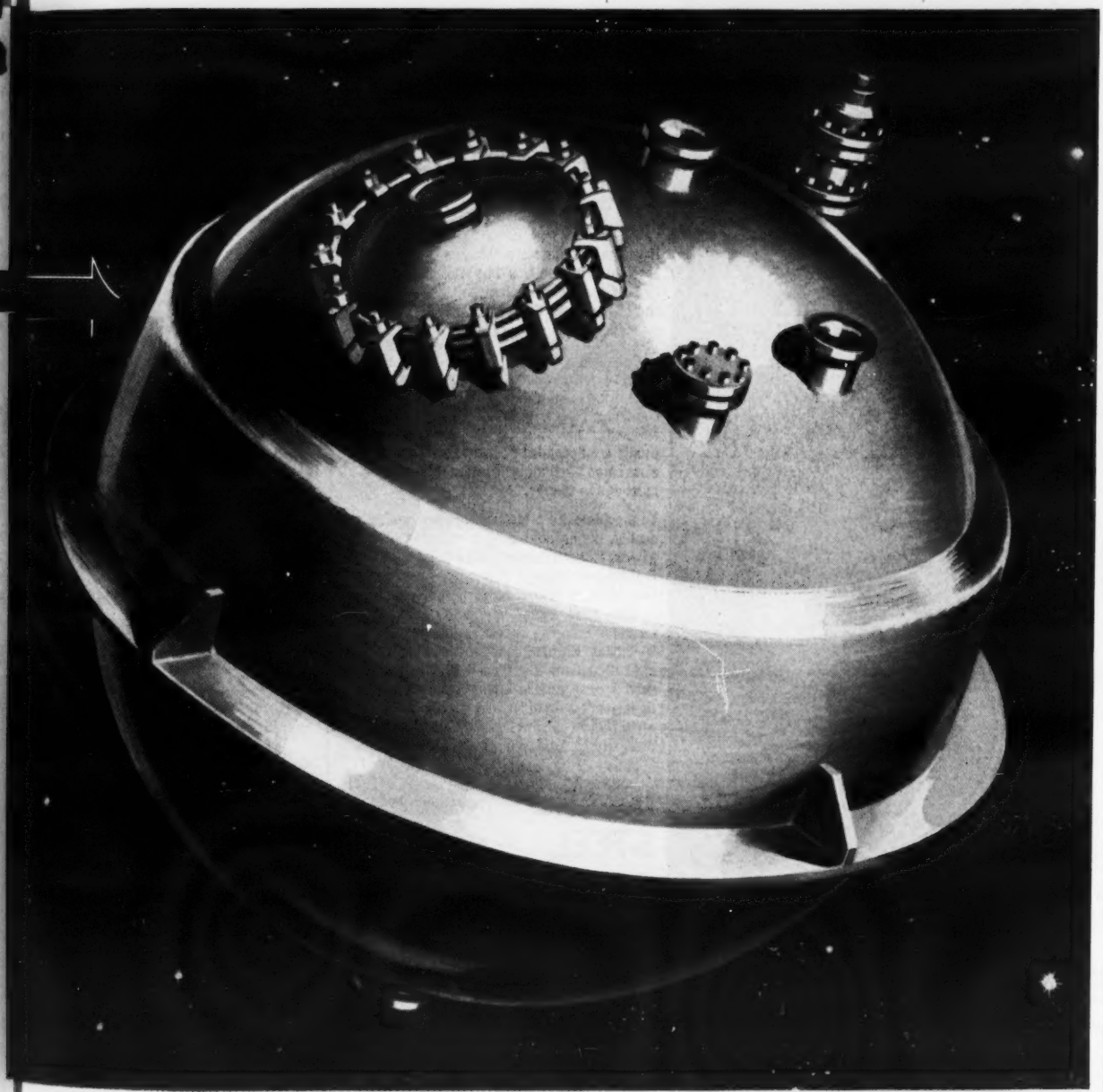
What's behind the Glascote sales engineer... and his glass-lined products?

— 38 years of Glascote experience in manufacturing glass-lined vessels and tanks for the process industries. Through continual research and development engineering, Glascote stays ahead of the demand for new and improved processes requiring a wider range of corrosion, temperature and thermal shock-resisting properties for glass linings.

In addition, Glascote gives you preventative maintenance help, in-plant seminars . . . specialized field service. Glascote is free to call upon the 83 years of accumulated research, engineering and manufacturing experience of A. O. Smith Corp.

He's an experienced engineer who can give you on the spot product and process assistance.





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meeting give support to Eisenhower scholarship idea for training scientists. Congress looks with favor on the proposal — money to finance it is expected to be voted this session. Another worry for those who fear increased government control — it may mean greater assurance of an adequate supply of scientists for industry, with money-saving cutbacks in college recruiting efforts.

With annual research and development spending at $9 billion but just $200 million for basic research, look for increased government and public clamor for reason why. Although chemical processors are among heaviest investors in basic research, they are likely to be tarred with the brush of "insisting on visible results" from research dollars. An optimistic note as pressure grows — possible tax advantages to corporations for money spent on basic research.

"I admire your initiative, Wilson, but we're not ready for 'Mutnik' yet."

(case history—Eli Lilly Company)

GERM FREE

as only a stainless steel drum can be !

If you process or store products that require absolute sanitation, you'll be interested in how Eli Lilly and Company, Indianapolis, Indiana—one of the world's leading producers of pharmaceuticals—uses Inland stainless steel shipping drums.

Lilly puts Inland all-welded stainless steel shipping drums through a rigid, high-pressure sterilizing process, and then fills them with antibiotics and seals them. Once sealed, the drums are depended upon to keep their precious cargo "Operating Room" sterile—in shipment and in storage.

To provide extra protection for your product's quality, during processing or shipping, it will pay you to check the many advantages of Inland Process and Shipping drums. They are manufactured from several types of stainless steel, in many sizes. Process drums: 30 or 55 gallon capacity. Shipping drums: sizes from 15 to 60 gallons, with all modifications necessary to meet ICC specifications 5 and 5C. Whether you need 1 or a carload—Inland can supply the right stainless drum for your requirements. For a free booklet on "The Use and Care of Stainless Steel Drums," ask your Inland representative or write:

INLAND STEEL CONTAINER COMPANY

Member of the INLAND Steel Family

6532 S. Menard Ave., Chicago 38, Ill.

Plants: Chicago • Jersey City
New Orleans • Cleveland and
Greenville, Ohio

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

Check 4935 opposite last page

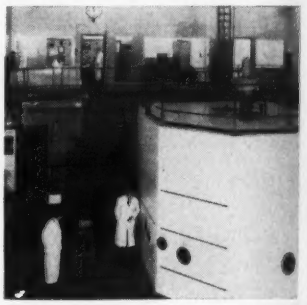
nuclear notes

MIT plans 2-wk course on radioisotopes

A two-week course reviewing basic aspects of production and use of radioisotopes and radiation, and recent advances in the field, will be offered at MIT July 14 through July 25, 1958. Tuition is $250, due and payable upon notification of admission. Academic credit will not be offered.

University of Frankfurt operates research reactor

The University of Frankfurt in West Germany now has its 50-kw research reactor operating. Built by Atomics International, the unit is a solution-type which uses enriched uranium 235 in a water solution as fuel. The reactor will be used for radiochemistry, materials and medical research, production of radioisotopes, and general nuclear research.



German reactor uses enriched U-235 in water solution as fuel

Fuels Technology Center ok'd for Argonne

Argonne National Laboratory has been authorized by the AEC to construct a Fuels Technology Center at Lemont, Illinois. It will be one of the most modern facilities of its kind and is expected to cost about $10 million. Completion is expected early next year. Great part of the work at the new center is expected to be devoted to plutonium research.

... Significant news about atomic energy

Reprocessing cost limit cited at 0.75 mill/kwh

To meet competitive costs for producing electricity from nuclear energy, cost of reprocessing fuel must not exceed 0.75 mill per kwh for reactors costing $250 per kw of installed capacity according to F. L. Culler Jr., of Oak Ridge National Laboratory.

The chemical plant doing the work must be able to process the output of many large reactors and probably many different types of fuel.

Mr. Culler covered these points in a paper, "General Economics of Chemical Reprocessing Using Solvent Extraction Processing," that he presented at the 1958 Nuclear Congress in Chicago.

Cobalt irradiation unit less than 2-ft high

Portable cobalt irradiation unit for industrial, school, and other laboratories is now in production. The self-contained radiation source stands less than 2-ft high and holds 62 curies of cobalt-60. Price is under $3000.

(Gammalab irradiation unit is product of Radiation Applications Incorporated, 342 Madison Ave., New York, New York.)

Check 4936 opposite last page.

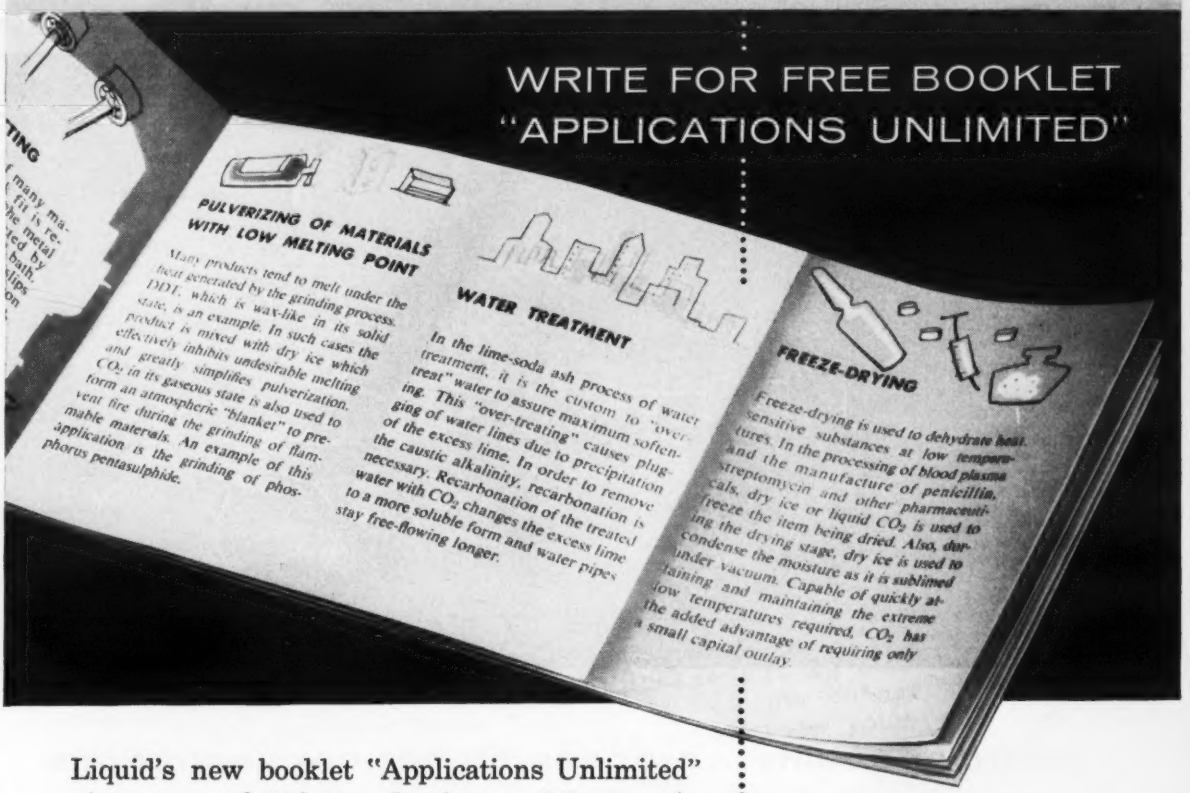
Projects Rover, Pluto propulsion studies

AEC has announced that work is continuing on Projects "Rover" and "Pluto". Project Rover is a Los Alamos study to determine the feasibility of using nuclear power to propel rockets. Field Experiments are scheduled for late in 1958.

Project Pluto is a study to determine the feasibility of applying heat from a nuclear reactor to ramjet engines. Plans are to construct a high-temperature critical facility, control building, and other shops at the AEC test site in Nevada in the near future. Cost will be about $1.2 million.

WHAT'S YOUR PROBLEM

AND HOW CAN CO_2 HELP YOU?



Liquid's new booklet "Applications Unlimited" gives you a brief introduction to 37 ways in which CO_2 is being used in modern industry. To find out how CO_2 can help your business, write for further information. Our technical staff is always ready to work with you. *Write today!*

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FIND OUT WHAT CO_2 CAN DO FOR YOU

For the free booklet "Applications Unlimited," just fill out this coupon and mail it. A list of the applications covered is at the left.

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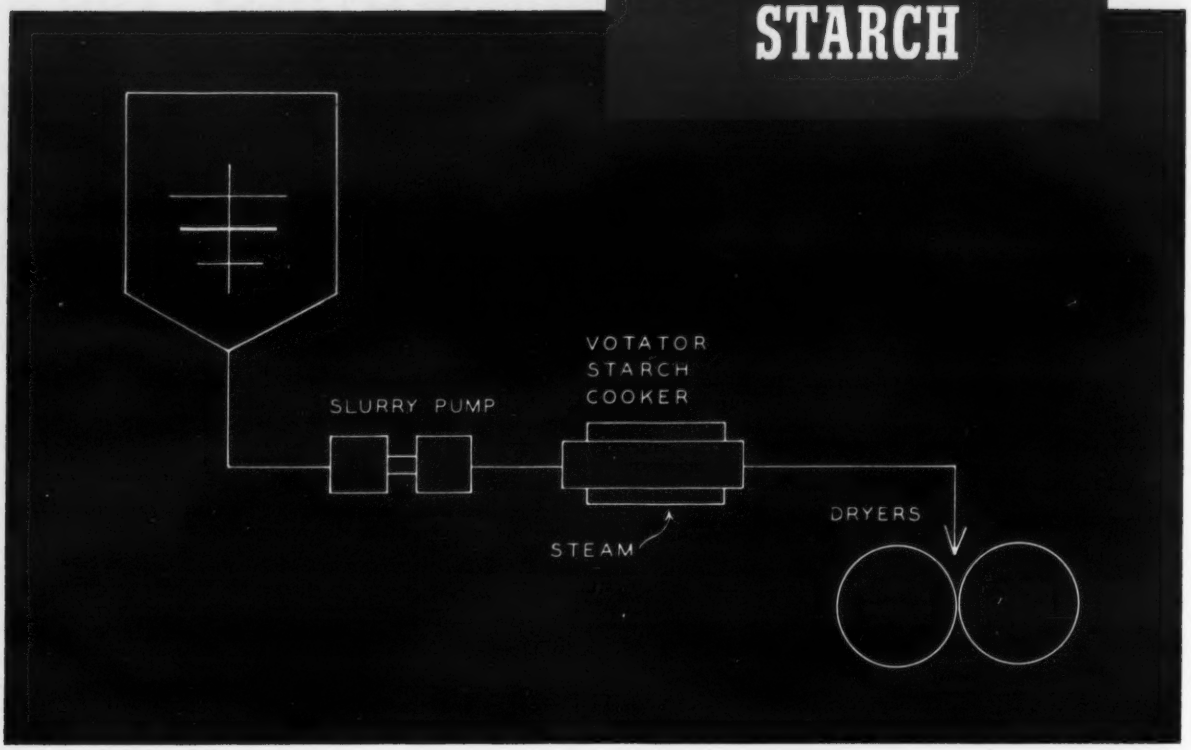
Check 4937 opposite last page

PREGELATINIZED STARCH



Improve quality...process higher concentrations with Votator® Starch Cookers

LEADING manufacturers of pregelatinized starch report these important benefits with VOTATOR* Starch Cookers, compared to conventional methods:

Improves quality. Assures completely uniform time-temperature treatment of virtually every starch granule . . . controlled conversion, gelatinization or fragmentation. Applicable to all types of starch.

Handles higher solids concentrations . . . slurries up to 45% (or pumpable limit).

Cuts drying costs for drum products. Higher solids mean lower steam consumption, more output from existing drums.

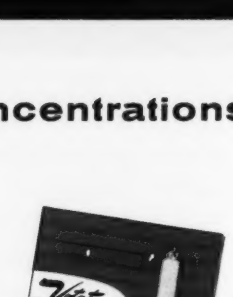
Improves drying operation. Provides thicker sheet, better distribution, excellent pick-up.

Increases flexibility. Allows modification of processing variables and controls each automatically.

Full details in Bulletin V247; free on request.

*VOTATOR—Trade-Mark Reg. U. S. Pat. Off.

Bulletin V247 free on request



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Sales Offices: Louisville • New York • Chicago Atlanta • San Francisco

Check 4938 opposite last page

NUCLEAR NOTES

Tanker may be converted to nuclear power

Contracts have been awarded by AEC and Maritime Administration for preliminary engineering and design studies for the conversion to nuclear power of a tanker now under construction. The ship, a 22,500 deadweight ton prototype, is designed for normal speed of 20 knots at 20,000 shaft hp. Contracts are with George G. Sharp, Inc., as ship design agent, and General Electric Company, as reactor designer.

Pilot plant converts uranium to UF_6

Irradiated uranium fuel has been converted to volatile uranium hexafluoride (UF_6) for re-use as nuclear fuel in work done at Brookhavan National Laboratory pilot plant. Results of nine pilot plant runs were reported at the 1958 Nuclear Congress in a paper by G. Strickland, F. L. Horn, and R. Johnson, of Brookhaven.

US to participate in Rome A-show

AEC has announced that the US will participate in the Fifth International Electronic and Nuclear Energy Exposition and Congress in Rome, Italy, on June 16-30, 1958. Plans call for the presentation of the peaceful uses of the atom. The US delegation will also present technical papers.

Laboratory expansion program for B&W

Babcock & Wilcox Company is expanding its critical experiment laboratory at Lynchburg, Va., to include a 10-kw pool-type test reactor. Unit will be used to conduct experiments involving nuclear fission at elevated temperatures, and also to test products of firm's nearby fuel element plant. Completion is scheduled for July 1.

LOST YOUR SLIDE RULE?

Then CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations. Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data Section." It begins on page 69.

For more information on product at right, specify 4939 see information request blank opposite last page.

NOT ONE FIELD CUT

in all This

MIDWEST

Shop-Fabricated Piping

...under a subcont...
and I would like to say the West Coast Division have on this job complied fully with the high standards of workmanship for which Midwest is known.

Throughout this entire project not once was a cut necessary to correct any piece of fabrication, and I might add in several instances close tolerances had to be met.

The above was not written on an impulse but as construction superintendent, this means but one thing: fast and low cost erection. Would appreciate your thanking Midwest personally for ...om a construction

Excerpt from letter by:
HOLMES & NARVER • Engineers-Constructors
828 South Figueroa St. • Los Angeles 17

Note particularly the words "*fast and low cost erection*" in the above letter. They characterize Midwest Shop-Fabricated Piping . . . whether for refinery, power plant or industrial installations. In this instance they were written by A. H. Chamberlain, construction superintendent, upon completing the installation of a Houdriformer Unit at the U.S. Oil & Refining Co., Tacoma, Washington.

There are three well-equipped Midwest pipe fabricating shops located to serve economically all sections of the country. Each is staffed by a highly skilled organization using the latest techniques. Each has wide experience on all kinds of projects so that the possibilities and limitations of all piping materials are well understood. You too will find it to your advantage to call in Midwest whenever you need fabricated piping.

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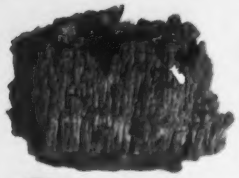
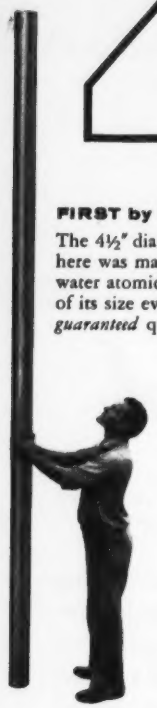
THE CARBORUNDUM METALS COMPANY



ONE experienced source of supply for Zr sponge...Zr ingot ...and now

Zr tubing



FIRST by Carborundum Metals—AGAIN!
The 4½" dia. x 13' Zr pressure tube shown here was made for use in a pressurized heavy water atomic reactor. This tube is the *first* of its size ever offered at a *fixed* price with *guaranteed* quality.

ZIRCONIUM TUBING manufactured to *your* specifications at a fixed price with guaranteed quality—another giant stride in the zirconium industry by Carborundum Metals. Orders for tubing are now being taken directly by Carborundum Metals where fabricating details are completely supervised for the end-user by working directly with highly qualified tube fabrication specialists.

● **TO THE REACTOR DESIGNER:** This new development in zirconium supply means that the superior and versatile qualities of this metal are available *now* for incorporation in the design of all types of nuclear reactors.

● **TO THE CHEMICAL PROCESSING ENGINEER:** Zirconium tubing ordered from one integrated manufacturer means that the super-corrosion resistance of this metal to either acids or caustics can be put to work in your systems *today*.

CARBORUNDUM METALS is an immediate source for your requirements in welded or seamless zirconium tubes, zirconium sheet, strip, bar, rod, wire, and foil. Commercial and nuclear grade certified zirconium ingots are ready for delivery in volume as are zirconium alloy ingots and sponge metal for open market use.

"MORE Zr FACTS"...This publication, the industry's first continuing source of technical information, is distributed by Carborundum Metals free of cost. A post card mailed today will place you on the mailing list to receive the next issue.

Write today **for latest price schedules and data sheets on all zirconium products. Address all inquiries to Dept. 91-88.**

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Division of THE CARBORUNDUM COMPANY
... Production Pioneer of Zirconium

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Check 4940 opposite last page

NUCLEAR NOTES

Fast breeder reactor for Britain

New atomic research station is nearing completion at Dounreay, Scotland. Its fast breeder reactor is of advanced

Reactor will be housed in 135-ft hermetically sealed sphere

design. There will be no moderator and it will produce more fuel than it consumes. Completion is scheduled for the end of this year.

Study melting points of reactor materials

According to a recent study, graphite with a sublimation point of about 6700°F, and niobium carbide and zirconium carbide, with melting points of 6800 and 6400°F respectively, have the highest melting points of any known material suitable for use in reactors. Study was made for AEC by Nuclear Development Corporation of America. It included over 65 materials.

Stone & Webster expands in nuclear field

In a move to broaden its activities in the nuclear field, Stone & Webster Engineering Corporation of Boston has acquired Associated Nucleonics, Inc. of Garden City, Long Island. The firm, formerly known as Walter Kidde Nuclear Laboratories, Inc., was purchased from Walter Kidde & Co., and Walter Kidde Constructors, Inc., which formed the research and development group in 1952.

WHY BORROW?

You can receive a personal copy of CHEMICAL PROCESSING every month.

Do you know that the magazine can come to you personally without charge, to your designated address?

If you . . .

would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

Fill it out, being sure to give all necessary information, and mail to Reader Service Department.

Perhaps . . .

others in your company would also like to receive CHEMICAL PROCESSING personally each month. Include their names on the form opposite the back cover.

Your application for subscription is welcomed.

For more information on product at right, specify 4941 see information request blank opposite last page.

From ship to train or shoreside storage . . .

TWO MILLION POUNDS OF BULK MATERIAL

handled daily by 8 Michigan Tractor Shovels

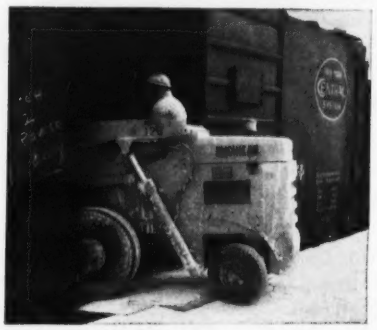
On Philadelphia's waterfront, eight high-speed tractor shovels are moving the amazing total of two million pounds of bulk material *every 8 hour shift!*

The machines are 16 cubic foot Model 12B Michigans. Their job, for Independent Pier Co., is to transfer England-imported china clay from temporary shipside hoppers to waiting rail cars and storage bins. Despite the high-volume output, it's not an easy assignment. Material, when disturbed, rises in choking clouds of dust, quickly covering men and machines. Loads must be moved through traffic 60 *to 900 feet*. And all work has to be done quickly to minimize high dock charges.

Under these pressures, Independent Pier has developed probably the fastest operation of its type along the waterfront—built around the speed and mobility of the eight Michigans.

Load-unload cycle averages 58 seconds

Approaching the hopper head-on, bucket skimming the dock, a Michigan in typical operation thrusts into the heaped clay. With flick of tilt-action lever, operator brings up his pay-load. No time is lost in repeated bucking; Michigan's pry-out action heaps bucket in a few seconds. At same instant, a flip of the forward-reverse lever backs the Michigan out of the hopper in a fast, tight turn. In "forward" again, the Michigan races for a boxcar, barely slowing to turn in—even through narrow six-foot doors. To heap



the clay as high as possible in either end of the car, the Michigan charges up the slope as if it were a hill. At top, operator simultaneously dumps bucket and power-shifts into reverse; the Model 12B backs down and swings out the door, ready to repeat the cycle. Operating at top speed through thick dust fog, over round trip haul cycles of 120 to 1800 feet, the Michigans have established a load-unload average of only 58 seconds!

Maintenance, new operators no problem

"Maintenance-wise" says master mechanic Mike Snowden Jr, "there's no comparison between these Michigans and other equipment. They not only need a lot less attention, they're much easier to service. A quick check at lunchtime—mainly knocking dust out of air filters—keeps them in top shape. Ruggedness and ease of operation are advantages, too. Hiring new stevedores every day means new operators for the Michigans—and *could* cause trouble. But new men learn fast on those simplified controls. They don't have to fight a clutch, either, and power steering is a big help pushing around in that clay."

Find out how Michigan ease of handling, speed and dependability can help *you*. Write us any time for complete details . . . or, better still, to arrange a no-obligation demonstration on your job.

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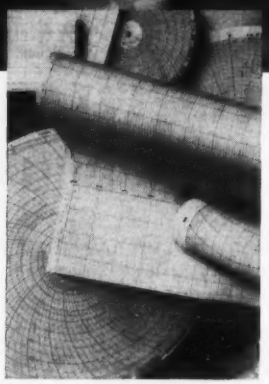

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Check 4942 opposite last page

Spotlight On People

Standard Oil of Indiana elects **Frank O. Prior** chairman and chief executive officer and **John E. Swearingen** president. Prior had served the company as president since 1955 and Swearingen had been an executive v-p since 1956.

David P. Barrett is named general sales manager, industrial chemicals, for the Davison Chemical Company division of W. R. Grace. Barrett was formerly general manager, rare earths, and will continue to have responsibility for these products along with the duties of his new position.

William R. Gehrke is appointed to newly created position of manager of international sales for the chemical division of Armour and Company. Gehrke has been with the company for the past ten years and has supervised export and import activities for the chemical division.

Gulf Oil promotes **Dr. Alex Lewis Jr.** to manager, petrochemicals department. Lewis was previously in charge of chemical marketing for the department and succeeds **L. O. Crockett** who was recently elected president of Goodrich-Gulf Chemicals in Cleveland.

Allied Chemical announces the appointment of **H. Dorn Stewart** to post of assistant to executive v-p.

Archer-Daniels-Midland appoints **Richard J. Savage** to post of marketing manager for polyester resins.

W. Horace Mason is elected president and general manager of Seiberling Rubber Co. of Canada, Ltd. Mason, who has been vice president and treasurer of the company, will fill the position vacated by the retirement of **Marcus L. Brown,** president and general manager since 1945.

Russell M. White is appointed general manager of newly created International Division of Stauffer Chemical. White will have primary responsibility for acquisition of rights

Highly Intimate Blends in 1 to 2 Minutes

Blends while discharging; No segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials – within 3 to 5 minutes of start of charging.

Six *complete* blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat – is highly effective yet gentle and safe even with explosives.

Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.

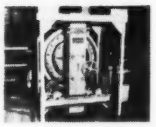
Discharging

Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

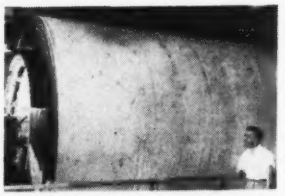
Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning – drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover – quickly and easily.

Nine standard models with capacities to 900 cu. ft.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs – can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 4943 opposite last page

to foreign processes and products; licensing of Stauffer products and processes in foreign countries; export sales; and commercial contacts abroad.

James O. King is promoted to post of manager of agricultural chemical sales for Diamond Alkali. With responsibilities connected with his new position, King will spearhead a newly expanded, long-term sales and technical service program.

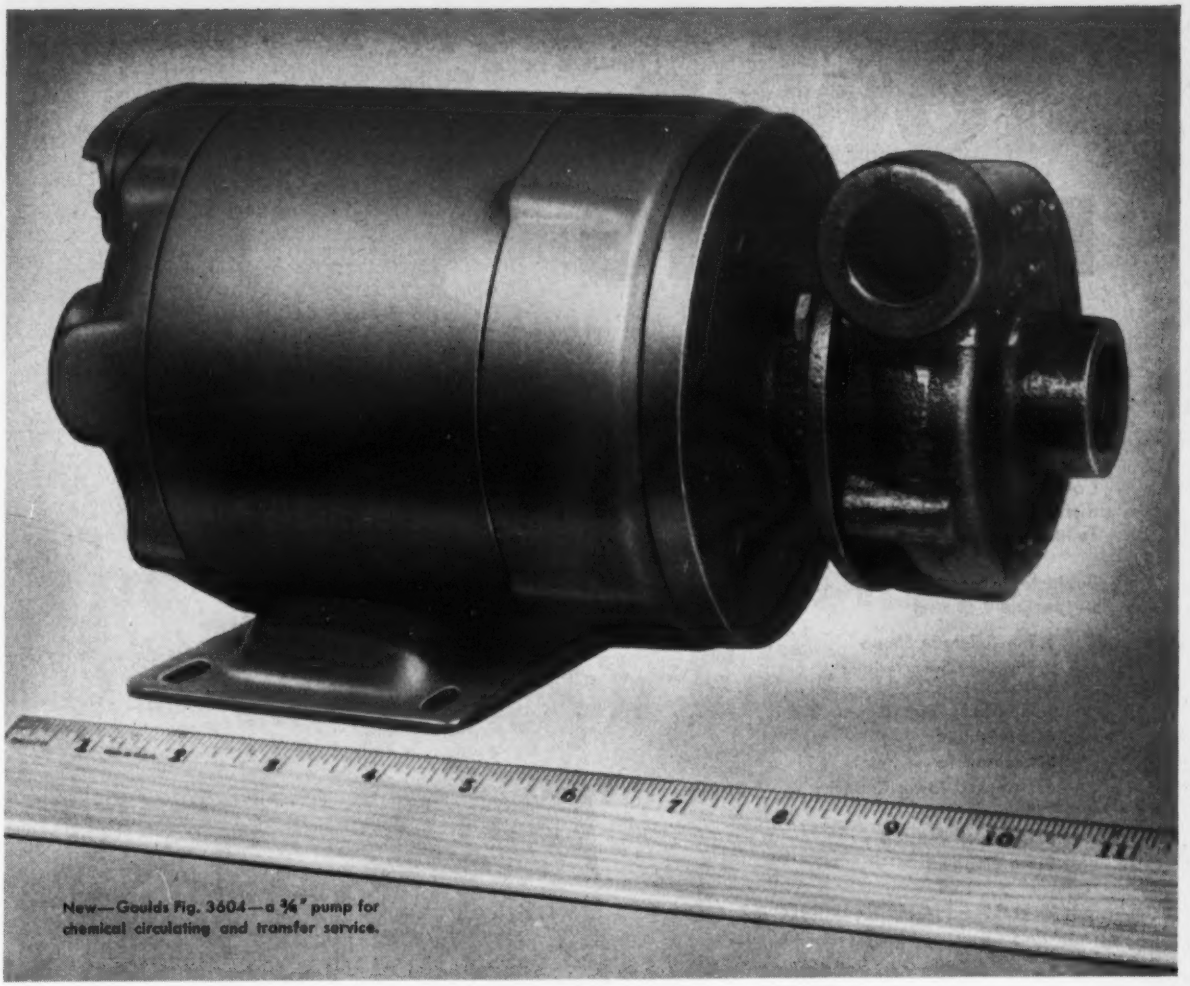
John R. Eck is elected president of Mobay Chemical. Eck, who had been assistant general manager of the inorganic chemicals division of the parent company, Monsanto, for the past five months, succeeds **D. L. Eynon Jr.** who recently became a vice president of Koppers Company.

New controller of Colton Chemical, a division of Air Reduction, is **Frank E. Evers.** Before joining Colton, Evers was with National Carbide, another Airco division.

George C. Cook is named manager of chemical market research and development for US Industrial Chemical, division of National Distillers and Chemical Corporation.

Arthur D. Little elects **Clarke Simonds** and **Joseph J. Snyder** to its board of directors.

All members of Monsanto's board were re-elected at company's 56th annual meeting of shareowners. The board consists of **Edgar M. Queeny,** chairman, **Charles Allen Thomas, Francis J. Curtis, John L. Gillis, Carroll A. Hochwalt, William W. Schneider,** and **Felix N. Williams** of St. Louis; **Thomas H. Barton** and **Trueman M. Martin** of El Dorado, Ark.; **Charles S. Cheston of Philadelphia; Fredrick M. Eaton** of New York; and **Ernest O. Lawrence** of Berkeley, California. And at Monsanto's organic chemicals division . . . **Matthew S. McCauley** is appointed director of marketing research.


New—Goulds Fig. 3604—a ¾" pump for chemical circulating and transfer service.

Here's a small pump with big-pump stamina

Ideally suited for handling corrosive materials

Small, compact—this new pump fits in where space is a problem. But you can rely on it for continuous service round the clock, round the calendar.

It's available from stock in 316 Stainless Steel—which provides the widest and most economical coverage of liquids commonly handled by a pump of this type.

The mechanical seal—with carbon, Teflon, stainless steel and ceramic parts—is noncorrosive.

The impeller clearance is externally adjustable to compensate for wear.

The pump is small enough (10½ x 5½ x 5½) and light enough (23 lbs. with motor) for lab or pilot plant operations. It's designed for temperatures to 220° F. and working pressures to 75 p.s.i. Capacities to 16 GPM and heads to 28 ft.

For circulating duty, as a component in larger equipment, this new Goulds chemical pump offers advantages in size, weight, cost, and dependable performance.

Complete information on this high-quality pump—performance curves and specifications—is offered in Bulletin 624A4. You can get a copy from your Goulds representative, or by writing us.

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PUMPS FOR CORROSIVES

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TOWER PACKING

All the facts about HARSHAW *tellerettes*

Contained in this comprehensive booklet discussing the application of Harshaw Tellerettes to tower packing.

Subjects discussed at length (accompanied by pertinent charts)

1. The Tellerette Shape
2. Physical Characteristics
3. Lower Capital Investment and Operating Cost
4. Low Weight
5. Reduced Tower Height
6. Increased Tower Capacity
7. Support Plates
8. Corrosion Resistance
9. No Clogging

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Check 4945 opposite last page

Equipment leasing — a growing trend

Feelings on the subject of leasing, CHEMICAL PROCESSING has found in a survey, are apt to be biased.

For the supplier of chemical processing equipment, leasing is a modern marketing tool that is helping him to overcome the "tough sell."

For the chemical producer, leasing is believed to provide an alternate method for acquiring and financing needed production equipment, and to obtain at the same time tangible advantages not available through the more familiar purchasing methods.

The chemical producer is said to be leasing equipment less than producers in other fields, such as fruit processing, where manufacturers *insist* on acquiring equipment exclusively on a lease basis. However, there appears to be a growing trend toward equipment leasing in the chemical industry.

Over-riding disadvantage, opponents say, is that cost of a machine in place is apt to be higher under the leasing agreement. Yet, with the infinite variations possible under leasing agreements, even this point is debated.

Whatever your reaction to the subject, you will be reading more about leasing every day. Here's an up-to-date explanation of the newest subject in processing economics.

CHEMICAL PROCESSING would like to have your comments about equipment leasing. Send your letter to: The Editor, CHEMICAL PROCESSING, 111 E. Delaware Place, Chicago 11, Illinois.

Have You Considered Leasing Production Equipment?

It offers advantages in the right situations . . . particularly for the capital-tight company. It reduces capital invested in fixed assets, skirts worries about rapid obsolescence and inflation

WILLIAM R. HEINS, President
United States Leasing Corporation
San Francisco, California

William R. Heins, president of United States Leasing Corporation, has been engaged in banking and finance for many years. Formerly a vice president of an investment company and associated with two banks, his interests and activities have been almost entirely in the field of commercial and industrial loans. Mr. Heins became president of United States Leasing Corporation in August 1957.

Today some industrial chemical manufacturers are renting all their production equipment and machinery — from their stainless steel storage tanks, crystallizers, dryers, pressure filters, to mixers, evaporators, and anything else that's needed.

Why lease rather than buy? Leasing is no cure-all, no infallible solution to all the financing problems of business. Leasing has certain virtues just as other forms of financing have other virtues. Unlike other financing, however, leasing involves no new partners, no new common stock with dilution of ownership or outside directors on the company's board.

Leasing also necessitates no periodic pay-back of loans — as is usually the case with bank borrowing — because no loans are involved. By the same token, leasing involves no assignment of receivables, as is often the case with business borrowings. Only the lease rental payments due within one year appear on the balance sheet. The portion due beyond one year will usually appear only as a footnote.

Main Virtue — Frees Capital

Major virtue of leasing is that it frees working capital for company expansion of sales, for taking of all trade discounts, for building balanced inventories for seasonal needs, for making more credit available to customers, for expanding research and development work — in short, all the customary uses of working capital.

The postwar trend toward expansion and diversity of product, coupled with a tight money market, has put pressure on the working capital of industrial chemical and drug manufacturers. As a result, more such companies are leasing instead of buying new equipment today.

To begin with, there is nothing complicated about the procedure. The chemicals manufacturer determines exactly what equipment he wishes to acquire, its cost and supplier, and tenure of the lease desired. United States Leasing Corporation's leases are written on straight line, declining balances, sum of the digits, or any other schedule tailored to suit the lessor's requirements. Plans are arranged from one to ten years and, normally, renewal options are available for extended periods. Total cost of a lease, spread over the term of the lease, is the original cost of equipment or facility plus a leasing charge for the lease term. The equipment, of course, belongs to the lessor at the end of the lease.

But, while the leasing method is simple enough, the simplest way to acquire new equipment is to take cash out of working

capital for the purchase. Despite the fact that this is simpler, some manufacturers prefer to lease. Why?

Relative Costs

Relative cost figures are the answer. The typical manufacturer in the industrial chemicals industry, according to Dun and Bradstreet, earns 21.49% — **after taxes** — on net working capital. Since all the corporations in this sample are in the 52% tax bracket, the profit before taxes is approximately 44% on net working capital.

Every industrial chemicals manufacturer is therefore faced with a similar problem. If he uses his own funds to buy new equipment, and if his working capital is capable of earning 44% before taxes, then by buying, he is paying 44% for the use of his money that's tied up in equipment. This does not even consider the effect of depreciation.

Thus, in a general way, it is important that a manufacturer examine his own operating ratios to see how often his working capital turns and precisely what investment of his own working capital would cost him directly.

But there are other ways to buy new equipment than by using working capital. Two of these are 1) purchase by means of a bank loan, and 2) purchase on a conditional sales contract.

As far as leasing versus outright cash purchase is concerned, a typical example of a chemical company might involve leasing $100,000 worth of new equipment with a seven-year composite life, a base period of five years, and two one-year renewals. This company might find that not only did it have more liquid cash as a result of leasing, but this cash (earning the typical 44% before taxes) would permit the company to earn approximately $50,000 additional net profits over the seven-year period.

This hypothetical company sold its equipment and leased it back

(Simplified balance sheet — before and after)

	ORIGINAL CONDITION	AFTER SALE-LEASEBACK OF ASSETS	
ASSETS			
Cash	$ 30,684	$ 80,684	Cash Increase: $50,000
Accounts Receivable — Net	345,508	345,508	
Inventory	703,292	703,292	
Current Assets	$1,079,484	$1,129,484	
Fixed Assets — Net	$1,033,232	$ 533,232	
Other Assets	119,896	119,896	
Total Assets	$2,232,612	$1,782,612	
LIABILITIES			
Notes Payable — Banks	$ 271,776	$ 171,776	$100,000 bank debt repaid
Accounts Payable	360,036	160,036	$200,000 applied to payables
Other Payables & Accruals	235,484	85,484	$150,000 applied to accruals
Fed. Income Tax — Estimated	92,000	92,000	
Current Liabilities	$ 959,296	$ 509,296	
CAPITAL			
Common Stock	$ 230,408	$ 230,408	
Earned Surplus	1,042,908	1,042,908	
Total Capital	$1,273,316	$1,273,316	
Total Liabilities & Capital	$2,232,612	$1,782,612	
WORKING CAPITAL			
Current Assets	$1,079,484	$1,129,484	
Current Liabilities	$ 959,296	$ 509,296	
Working Capital	$ 120,188	$ 620,188	
Current Ratio*	1.13	2.22	

*Drastic change in current ratio shows strong influx of cash into company, improving opportunity for consolidating previous expansions

Purchase by means of a bank loan might be limited by terms of the usual loan. Normal terms are that the loan be for only 75% of the value of the equipment at an effective rate of 5½% simple interest (because of the compensating balance) for a term of five years.

Over a seven-year period, it is possible for the rental plan to free a greater amount of working capital than the bank-loan-purchase plan. Obviously, where working capital is freed, company earnings can be greater. In the case of our typical chemical company, the greater net profit at the end of seven years, could be about $10,000 as a result of leasing instead of acquisition through a bank loan.

What about leasing versus conditional sales contract purchases? Here the cash flow difference is also significant; for the greater capital freed by leasing might show about $20,000 additional net profit at the end of seven years in the case of our typical chemical company.

Yet it should be emphasized — again and again — that where a chemical company has all the working capital it needs, and can afford to use it to acquire fixed assets, there is no need to lease. The major virtue of leasing — despite what claims may be made — is that it frees working capital, and this action normally means more earnings. This is the basic reason for leasing.

Any Tax Advantages?

In general, leasing is most beneficial for those companies whose operations could expand profitably if additional working capital, in the form of equipment and machinery, were available at smaller annual expense than through use of their own capital.

Nothing has been said about the tax advantage in leasing. This is because there is no clear-cut ruling on the matter and every case differs.

Ruling 540 of the Internal Revenue Service says:

> "If it is held . . . that an agreement is a lease, (then) the lessee may deduct the amount of rent paid or accrued . . . If the payments are so arranged as to constitute advance rental, such payments will be duly apportioned over the lease term . . . (But) if the agreement is to be treated as a sale, the amounts paid to the vendor will be considered as payments for the purchase of the equipment to the extent such amounts do not represent interest or other charges, (and) . . . may be recovered over the life of the asset through appropriate depreciation deductions."

Thus, if the intent of a lease is merely to speed up the deductibility of the purchase cost of a piece of equipment, the transaction is likely to be construed as a purchase by the Internal Revenue Service — thus frustrating the intent of full tax deductibility of rental payments in any one year.

On the other hand, if the lease is a genuine lease and not a disguised conditional sales contract, then payments under the lease are normally tax-deductible in the year paid. In court cases a *bona fide* lease has been held to have three characteristics: 1) the rental payment is reasonable, 2) the rental (after renewal of the lease) is about equal to the value of the property at the option date, and 3) conduct of the parties is consistent with a leasing-type agreement.

Purchase-option provisions in a lease are scrutinized carefully because they might seem to indicate that the lease is a sort of conditional sales contract. As a result, the best practice is to omit any purchase options from a lease, thus obviating any risk of having the leasing contract treated as a conditional sale.

Since no one can tell which way the Internal Revenue Service will rule, the best policy under the circumstances is to write a genuine lease which in light of previous rulings is most apt to be accepted. Rental payments are then most certain to be deductible.

Only in some special situations will leasing offer tax advantages but few companies are in these special circumstances. The major advantage of leasing, as mentioned previously, will not be the tax deductibility of rentals, but in the way leasing frees dollars for more profitable uses that would otherwise be invested in ownership of fixed assets.

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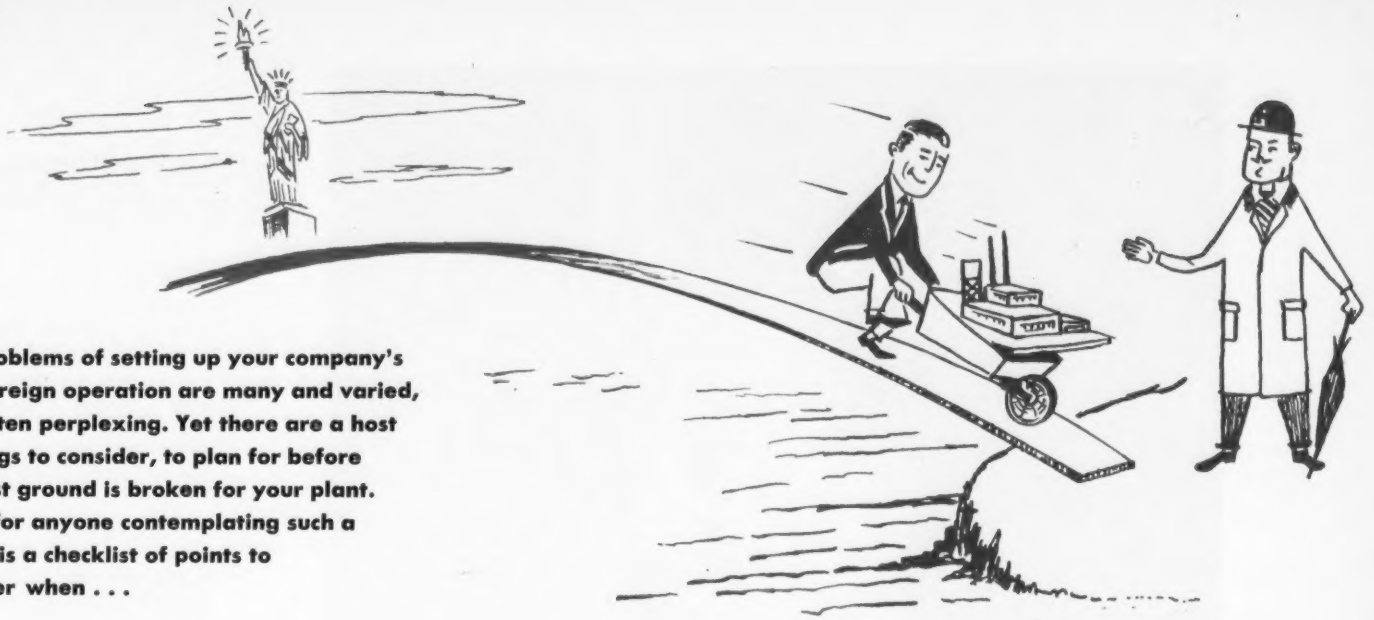

The problems of setting up your company's first foreign operation are many and varied, and often perplexing. Yet there are a host of things to consider, to plan for before the first ground is broken for your plant. Here, for anyone contemplating such a move, is a checklist of points to consider when . . .

Making Your Move into Foreign Operation

R. E. DeRIGHT
Assistant Director
International Department
E. I. du Pont de Nemours & Company

Dr. Robert E. DeRight joined Du Pont in 1937 as assistant to the director of the patent section of the former Rayon Department (forerunner of the current Textile Fibers and Film Departments). In 1939 he became secretary of the nylon steering committee, in 1940 he was named special assistant to the general manager of the Textile Fibers Department, and in 1943 became special assistant on atomic energy in the Explosives Department.

DeRight was named manager of the European Division of the Foreign Relations Department in 1945, and became manager of the Technical Division in 1946. He was appointed assistant director of the department in 1954.

He is vice president and a director of Du Pont Inter-America Chemical Company and Du Pont de Venezuela C. A.; and a director of Du Pont (China) Inc., Du Pont (Peru) S.A., and Du Pont S.A. de C.V. and Cia Mexicana de Explosivos, S.A.

Setting up operations in a foreign country for the first time might well be compared to taking the first plunge at dawn into unknown waters. You have often visited the locale and have been told that, although the water is cold, bathing is very pleasant once the plunge has been taken. Despite these assurances, as well as confidence in your advisers, there may be great hesitation before that plunge is taken; and well there should be.

If the initial foreign manufacturing operation has been preceeded by selling operations and there are resident personnel familiar with the country and its customs, the problems to be faced are minimized, but are still very much present. In the more highly industrialized countries more information is available and procedures are better standardized than in countries where industry is less developed. Nevertheless, there are many uncertainties and problems to resolve.

Fundamental among these must be the recognition that you are a foreigner accepting the hospitality and privileges afforded by the local government and its citizens, and the resolution that you will adapt yourself to them and be a good corporate citizen. This does not mean that you must subordinate the interests of your company and its stockholders to the interests of your host country; but that you must keep the interests of both always before you. Unless you can conduct your business so that it is a benefit to the economy of the country as well as to the stockholders, there can be no long-term success.

It is not possible within the limited space available here to do much more than identify the areas of concern, which generally fall into two broad categories: those which are common to any manufacturing and sales operation, whether domestic or foreign; and those which are peculiar to a United States company wishing to operate in foreign countries.

The first group of problems includes such things as availability of raw materials and labor, management, plant design, market analysis and sales distribution, inventory and credit control. The second involves currency exchange, convertibility of the local money to dollars and possible devaluation; financing and corporate problems, and tax considerations introduced because two governments and currencies are involved; even problems attendant upon bringing US nationals, their families, and their property into a foreign country. Housing, and education of children must be considered.

Despite the difficulties, domestic experience permits fairly straightforward solutions to the first group of problems. If possible, it is much easier to start initial operations on a fairly modest scale so that the problems and consequences of error can be reduced in direct proportion. In other words, it is very helpful if one can feel one's way and learn by experience. However, in the chemical industry it is not always easy to operate

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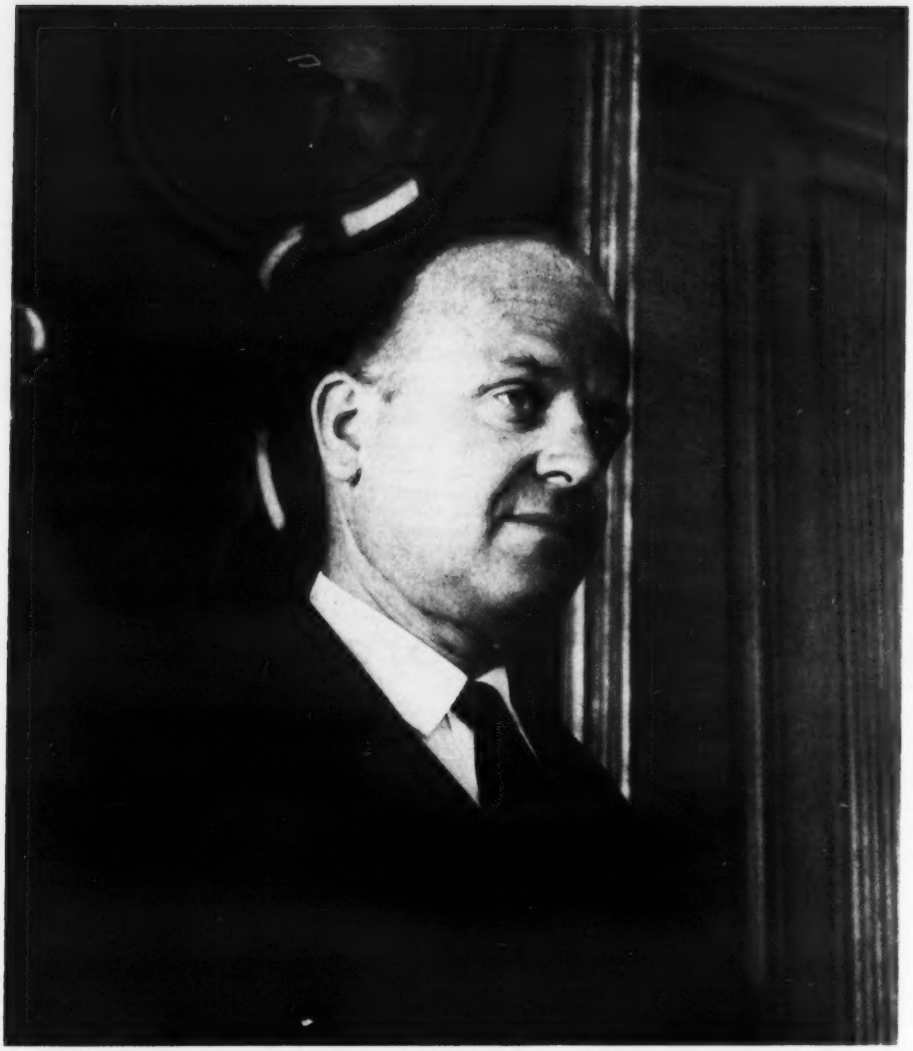

In his office on the tip of Manhattan, the head of the House of Grace stands before a portrait of his father, Joseph Peter Grace Sr., who preceded him as president

A ten-fold sales increase in ten years; the ninth-ranking US chemical company built from scratch in four years — these are some of the accomplishments of J. Peter Grace Jr. since he took over the presidency of W. R. Grace. Here's a look at . . .

the remarkable HOUSE of GRACE

By **BILL SCHREMP**
Chemical Business Editor

IN the interests of science, a healthy young athlete recently was asked to spend a morning with a three-year-old child, imitating the child's behavior and sharing all its activity. By noon the athlete was utterly exhausted while the child bounced on, showing no signs of fatigue. The president of W. R. Grace & Co. could teach the young athlete a thing or two about perseverance.

During his weekends at home on Long Island, and when he is not "on the road," 46-year-old J. Peter Grace, president of the 104-year-old company bearing his family name, entertains his eight young children with such vivaciousness that by noon he has outplayed all of them, even invented some new forms of activity, and has sent them packing off for well-deserved siestas.

Then, taking advantage of the short-lived serenity, he settles down for an afternoon of correspondence reading that brings him up to the hour on business conditions throughout the world. In a short time he has jotted down enough ideas, recommendations, and orders to keep a healthy number of secretaries busy throughout the next week. Once the children are awake, it's back to the enjoyment of a warm, personal family life until Monday morning, promptly at 6:30, when he heads away to the office taking with him this animated spirit that has made him a living legend among his many

business associates who are obliged to keep up with him.

His terrific drive and tenacity have been characteristic of Peter Grace since his boyhood days.

A Yale classmate of his, ('36), Bob Cooke, well-known columnist and sports editor of the New York Herald Tribune, recalls that, besides being a good golfer and fearless polo player, "Pete Grace was one of the most voracious hockey goalies I've ever seen in the college sport, and that's a unique tribute to an athlete."

He continued playing polo and was top goalie for the famed St. Nick's Hockey Team of New York City until, as he began moving up the executive ladder in the business organization, it was strongly suggested he retire from his teeth-rattling, hard-riding sports life; not because he wasn't concentrating enough on business, but simply because the company was expecting him to be around for a good, long time.

It didn't take the Grace "old guard" long to realize the tremendous vitality of this newest member of the family. He had worked night and day since his graduation from Yale, and his teachers soon found they had a willing and remarkably able student of big business. In 1945, with nine years of company experience behind him and the opportunity to write his own ticket for the future, J. Peter Grace ascended to the presidency of the House of Grace.

The war over, Peter Grace found his company in an exceptional position. It owned a major steamship line, a half-interest in a prospering airline, a substantial import-export business, manufacturing and agricultural holdings in South America, and a bank in New York. But Peter felt that the future of the company depended upon giving it a firm industrial base in the United States. His plan was to build operations here which would contribute to strengthening Grace's positions in South America, an area he credits with a tremendous growth potential.

The chemical industry wasn't the only — or, indeed, the first — field explored. Endless surveys and evaluations were made — the company actually made a short-lived start into the manufacture of farm equipment. But one by one the contenders were eliminated, and in 1952 the chemical industry was where he finally placed his bet — a substantial part of the Grace company holdings.

The Beginnings

To understand the Grace company as it exists today, it's necessary to know something of the company's history. Actually, W. R. Grace & Co. has been associated with the chemical business in an offbeat way for more than a hundred years. William Russell Grace himself started it all in the early 1850's, in Peru, where he'd gone with his family from their native Ireland.

He went to work for Bryce & Co., a ship chandlering firm that sold supplies to guano vessels that converged on Peru from all over the world, gathering cargoes of the natural fertilizer found in abundance on islands along the Peruvian coast. The ships had to put in at a port 100 miles away from the islands to take on supplies for the long return trip.

William Grace anchored an old barge stocked up with supplies off the islands, eliminating the need for shippers to put in at port. The success of this venture can be estimated by the fact that he became a full partner before he was 22 years old. When he went into business for himself, he built up the first of the famous Grace Line trade routes and expanded his company's operations into the nitrate business, forming the Nitrate Sales Agency Co. to market nitrate fertilizers in the United States.

Grace and Chemicals

The Grace Company's first chemical manufacturing venture in the United States was its fertilizer mixing plant, NACO Fertilizer Co., founded in 1907. Although it prospered, it accounted for little more than one-half of one percent of the company's total assets at the end of World War II.

After Peter's decision to get into the chemical business, and recognizing that the only way to get into it fast was through acquisitions, the search for good companies began. Davison Chemical Corporation of Baltimore, Maryland, had a special appeal to Grace. Its product lines, agricultural chemicals, and petroleum catalysts fitted neatly into the South American picture and Grace's plans for petrochemical development. Grace started acquiring Davison stock in 1950, during which time Davison's sales almost doubled, and in 1953, W. R. Grace & Co. controlled over 60% of the votes. The merger was completed in May 1954.

In the meantime, Grace Chemical Company had been formed and work on a $20,000,000 agricultural chemical plant was started in Memphis, Tennessee. The plant, producing ammonia and urea, went on stream in 1954. This was the first large investment by Grace in a chemical plant built from the ground up.

In September 1954, Dewey and Almy Chemical Company of Cambridge, Mass., manufacturers of sealing compounds, battery separators, and experts in the field of plastic colloids, was acquired by merger, and W. R. Grace & Co. suddenly was a big name in the domestic chemical industry.

During these days, one of the prime concerns was getting new blood into the management group. At the time Peter took the helm, nearly all its older executives had joined the company at early ages, had worked in all operations at one time or another, and most of them were oriented toward the shipping and trading business. While a substantial number of these men had acquired considerable experience in industry in Latin America, principally sugar and textiles, Peter needed chemical specialists.

Perhaps the first chemical executive of consequence to join Grace was William P. Gage, now president of Grace Research and Development Division, supervising a central research program with a budget this year of over $9,000,000. A graduate of Shell Chemical, Gage was the first president of Grace Chemical Company and saw the new organization through its fledgling days. Other early joiners were Hugh Ferguson, former president of Dewey and Almy, and Marlin Geiger, who had been the Davison president and who remained in that post after Grace took over. Today Geiger is executive v-p in charge of the entire Chemical Group.

Probably the most illustrious name to join Grace in those days was Charles E. Wilson of General Electric fame, who became chairman of the board of W. R. Grace & Co. after service as head of the Office of Defense Mobilization under President Truman. During his tenure with Grace he was instrumental in the Dewey and Almy and Davison mergers. But perhaps his most important contribution to the whole concept was to make it clear to Wall Street that Peter Grace was dead serious about his ambitions.

Equally important was the need for bright young men below the vice president level. Peter Grace, by all standards a bright young man himself, liked to find people with ability, then let them develop as quickly as they could. At first just a trickle . . . the early development group consisted of less than a dozen men . . . the influx of technical men and specialists grew tremendously. The company had a total of fifty technical degrees among its personnel ten years ago. Today it numbers over a thousand.

Today

The Grace Chemical Group today operates as seven separate divisions, joined at the top by an extraordinary system of reports and communications with Peter himself, who is on the move about five months out of the year, personally stimulating the activity and sales of Grace throughout the hemisphere.

Besides Dewey and Almy, Davison, and Grace Chemical, four other divisions are now active. Cryovac Company Division makes a vinylidene chloride copolymer film used principally for packaging food products. Dewey

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DR. JESSE WERNER, Director
Commercial Development Department
General Aniline & Film Corporation

LATEST DEVELOPMENTS IN ACETYLENE

With Special Emphasis on Those Made by

Dr. Jesse Werner is a native New Yorker. After his BS degree from Brooklyn College, he earned his doctorate in organic chemistry at Columbia. He then started with General Aniline as a research chemist, and has progressed through the organization until he is now Director of Commercial Development.

He has authored and co-authored over 35 patents and publications on various phases of organic chemistry and chemical engineering.

Dr. Werner is a member of the CCDA, CMRA, Sigma Xi, Association of Research Directors, and the Research Committee of the NAM.

Acetylene continues to be one of the favored raw material building blocks in organic chemistry. There is a steady and, in some cases, accelerated rate of growth in volume of production for currently available chemicals derived from acetylene. Increased uses and new applications are constantly being evolved for neoprene, vinyl chloride, trichloroethylene, perchloroethylene, vinyl acetate, acrylonitrile, and acrylates. In addition, new products continue to be developed. Among these are acrylates, methylstyrene, methyl butynol, vinyl esters, and the "Reppe chemicals." (Reppe chemicals are those derived from high-pressure reactions of acetylene.)

For economic reasons, new production of acetylene is now based on hydrocarbons rather than calcium carbide. Three acetylene plants, fed on natural gas and using the Badische Sachsse process, are in use in the United States. They are owned by Monsanto, Union Carbide, and American Cyanamid. Another is being constructed by Rohm and Haas at Houston, Texas. Several others are in the planning stages. In addition, new or modified processes based on hydrocarbons have been developed by Eastman Kodak, Hoechst in Germany, and L'Azote in Belgium.

Acetylene Chemicals

Of the products produced at standard reaction pressures, the existing and planned production of acrylonitrile from acetylene has reached levels which make it the major bulk chemical developed from acetylene since the war. Present annual capacity is over two hundred million pounds. All projections and planned additions to present capacity indicate that it will continue to grow at a rapid rate as a starting product for fibers, nitrile rubber, plastics, and other polymers.

A number of other interesting new chemicals based upon acetylene reacted with various other materials at standard pressures are also being offered. Among these are new acetylenic alcohols and glycols by Air Reduction, new acrylate esters by Rohm and Haas, various vinyl esters, and other vinyl compounds.

Another challenging area for growth in acetylene chemistry is found in the application of high-pressure reaction techniques. Novel compounds of a wide range of structures from such reactions are already available commercially, and more can be expected.

High-pressure Products

General Aniline and Film Corporation's plant at Calvert City, Kentucky, is the first one in the United States to utilize the high-pressure techniques of Reppe Chemistry. The ethynylation reaction, whereby acetylene is reacted with formaldehyde, is used to produce propargyl alcohol and butynediol, which give rise to a new family of chemicals. The initial applications for these materials were discussed in the February 1955 issue of CHEMICAL PROCESSING. A number of the newer uses which have since been developed are discussed below.

Propargyl alcohol ($CH{\equiv}CCH_2OH$) is the simplest acetylene derivative of the series being offered by GAF. Its general properties as a corrosion inhibitor are being exploited in the prevention of hydrogen embrittlement and in oil well acidizing. The reactive structure of propargyl alcohol makes it an obvious choice as a chemical intermediate and in other areas where the high energy content of the triple bond can be of value. One of the newest syntheses for 2-aminopyrimidine, a sulfa drug intermediate, is based on propargyl alcohol.

2-Butyne-1,4-diol ($HOCH_2C{\equiv}CCH_2OH$) is another acetylene derivative with a reactive triple bond which gives it uses as an intermediate in a variety of reactions. In addition, it and some of its derivatives have proven to have a unique place as additives in various electroplating solutions.

1,4-Butanediol ($HOCH_2CH_2CH_2CH_2H$) has been found to have many plus values for monomeric and polymeric plasticizers for polyvinyl chloride. These new plasticizers are rapidly growing in industry acceptance. In addition, butanediol is being used as a component in specialty polyesters, polyurethanes, and epoxy resins.

γ-Butyrolactone, 2-pyrrolidone, and N-methyl-2-pyrrolidone are three powerful, closely related general organic solvents. Butyrolactone and methyl pyrrolidone are both being used commercially as selective solvents for acetylene in commercial Sachsse acetylene plants.

Butyrolactone is also a chemical intermediate for the herbicide 2,4-dichlorophenoxybutyric acid, and for other aliphatic and heterocyclic chemicals.

2-Pyrrolidone forms a nylon-4 type polymer which, in preliminary experiments, has given textile fibers, injection molding

The steady growth of acetylene production from three billion cubic feet in 1947 to over six billion cubic feet a year now, testifies to the increasing popularity of acetylene-derived products (synthetic rubber, plastics, acrylonitrile and its derivatives, and solvents) and to the continuing development of both low-pressure and high-pressure acetylene chemicals.

E DERIVATIVES

by High-pressure Reppe Techniques

compounds, and films.

N-Vinyl-2-pyrrolidone is a monomer having wide uses in copolymerizations for modifying the characteristics of a whole series of monomers such as vinyl acetate, vinyl chloride, acrylonitrile, styrene, etc. In these applications it can alter the solubilities, strength, adhesion, melting point, or dielectric properties of the polymers.

Polyvinylpyrrolidone

Polyvinylpyrrolidone is the product arising from the high-pressure reactions of acetylene which has probably caused the most general interest and displayed the greatest number of unique properties. The first commercial uses were as a pharmaceutical and cosmetic ingredient, and while those are continuing, many new applications are entering into its sales pattern.

PVP is now the starting point for a series of new PVP-iodine formulations used in a variety of germicidal applications in proprietary and ethical drugs. The proprietary products are marketed under the trade name Isodine by Isodine Pharmacal Company. Another new pharmaceutical use for PVP involves its applications as a concentrating medium for body fluids by dialysis. PVP, modified by the addition of other monomers, has given a base for aerosol spray bandage formulations.

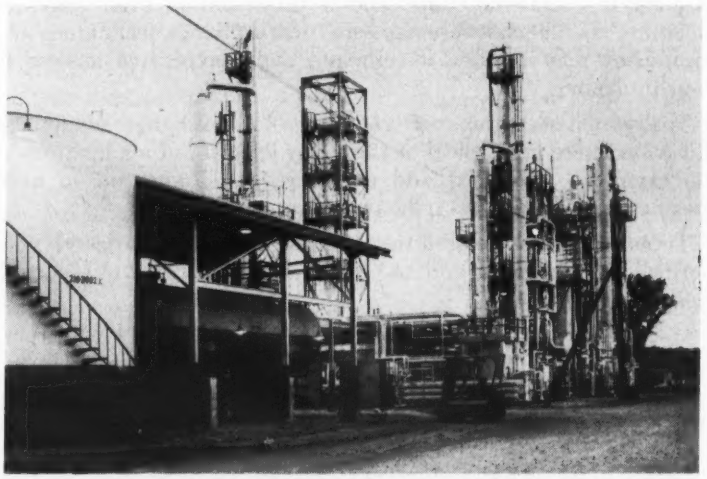
As a synthetic fiber additive, PVP has been found to give superior dyestuff receptivity. Other textile uses for PVP as a protective colloid in application of fugitive tints, dyestuff stripping, soil suspension, and sizing of glass fibers have all been developed. Its use as a protective colloid in inks, paints, waxes, and adhesives are diversifying and growing steadily.

A whole new area of use for PVP is expected to develop in the food and beverage field. It has recently begun to be used by the brewing industry as a clarifying agent for beer, and has been approved for a similar use in wines. Other applications are being developed for PVP as a clarifying agent in vinegar, fruit juices, and jellies. It is also of value as a protective dip for frozen meat, poultry, and fish.

Even such a brief review as this gives some indication of the potential growth to be expected from the high-pressure acetylene derivatives which have reached the commercial stage. It is further evident that these products, although having been under intensive study for a number of years, have not yet reached the limit of their useful applications. The number of their applications can be expected to grow for many years to come.

Future Growth

Work is continuing both in this country and abroad on other aspects of high-pressure acetylene chemistry. Although most of the compounds synthesized in this research have not yet reached the commercial stage, many are or can be expected to do so in the future. They include vinyl compounds synthesized from the reaction of acetylene with alcohols and acids, and the polymers and copolymers made from these monomers.



Reppe Chemicals from acetylene are made at General Aniline's Calvert City, Kentucky, plant

Cyclooctatetrene, another development item from high-pressure acetylene chemistry, is an eight-membered aromatic type compound made by the direct polymerization of acetylene. Its general chemistry is undergoing extensive study by organic chemists. Already certain specific applications for cyclooctatetrene appear to be possible in the synthesis of sebacic acid and in the production of nylon-8.

The commercially available products made by the Reppe type reaction previously discussed are also capable of giving further products. For example, 2-butene-1,4-diol, the first olefinic diol to be potentially available from commercial sources, can be prepared from butynediol. It is of interest in Diels-Alder type reactions to form complex carbon rings for agricultural chemicals and pharmaceuticals.

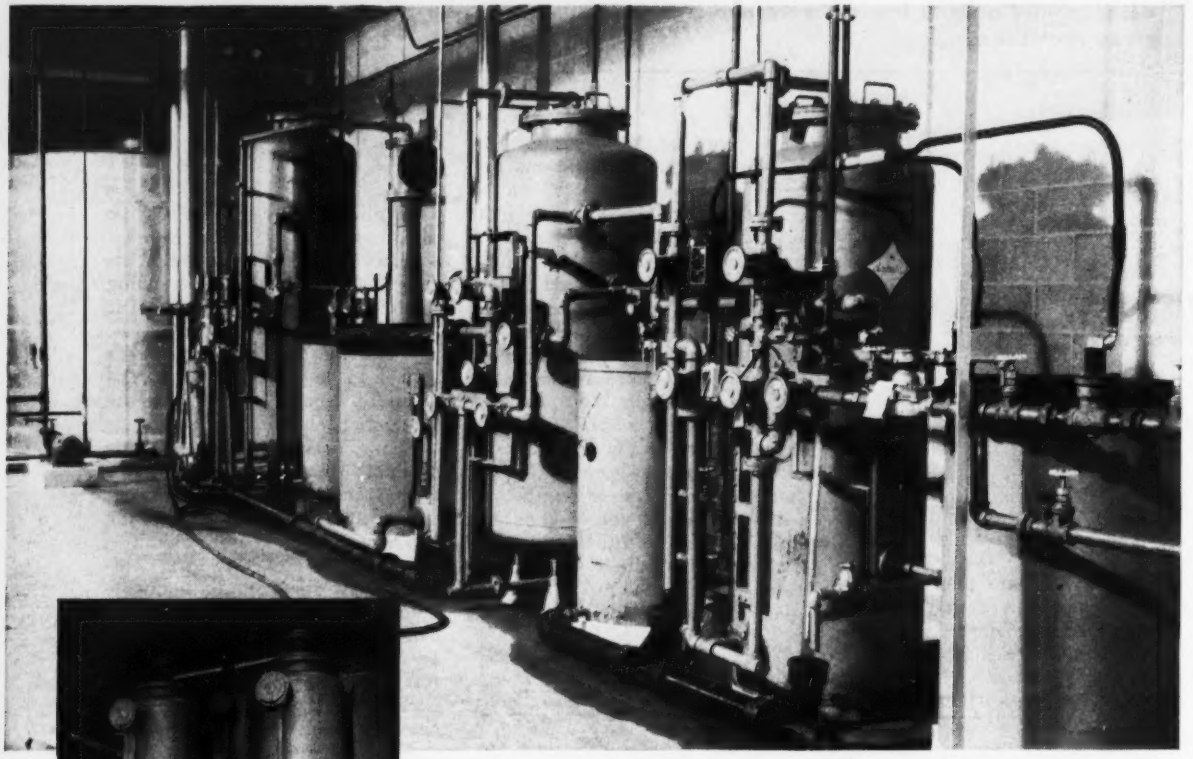
A modified branch of Reppe acetylene chemistry at normal pressure is employed by Rohm and Haas in this country in the reaction of acetylene with carbon monoxide and alcohols to form acrylic esters. Such esters are commercially available and used in synthesizing a large number of polymers and copolymers. Acrylates can be expected to grow rapidly, particularly for water-based paints and a number of other polymer applications.

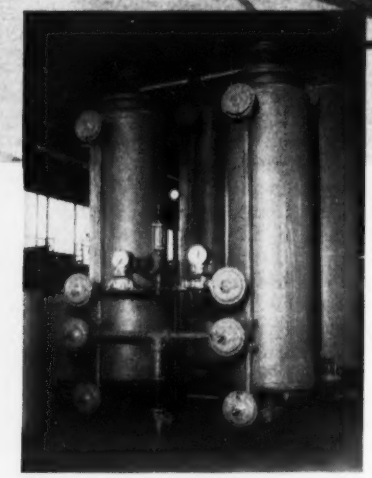
Air Reduction is using acetylene at standard pressures not only for the manufacture of vinyl acetate, but they are also offering a series of acetylenic glycols and alcohols. They have recently announced plans for the construction of commercial plants for methyl butynol and methyl pentynol for use as solvents, pharmaceutical intermediates, and other applications. A vinyl stearate installation has also been announced. This is useful as a monomer in a number of copolymers. These products have also developed applications as chemical intermediates for a variety of end uses.

The recent surge of interest in

INDUSTRIAL ION EXCHANGE TECHNIQUES

. . . low cost solution to specialized purification problems





EXAMPLE 1: *Purification of Formaldehyde.* Specialized anion exchange technique removes formic acid from formaldehyde. This *Industrial* semi-automatic, dual unit also "up-grades" water white formaldehyde for resin manufacture—yields final resins with resistance to off-color blush or bloom.

EXAMPLE 2: *Chemical preparation.* An *Industrial* mixed-bed ion exchange unit used for removal of sodium formate and formic acid from an organic polyhydric alcohol intermediate. Process facilitates subsequent purification by evaporation.

• Are you concerned with the removal of mineral impurities from solvent solutions—chemical intermediates—purification of glycerine—or other materials which usually require tedious, costly processing by alternate methods? If you are faced with the problem of purifying such materials, and if they contain even traces of moisture, then *Industrial*-engineered ion exchange techniques and equipment may provide a complete and inexpensive answer to your problem.

The two installations of *Industrial* ion exchange equipment illustrated here are typical of the many specialized applications of ion exchange developed and engineered by *Industrial* to meet specific chemical process industry requirements.

To evaluate the possibilities of these techniques to solve your purification problems, and to obtain an analytical study, consult *Industrial*, soon.

For general information covering *Industrial* Ion Exchange equipment, write for a copy of BULLETIN 200.

INDUSTRIAL

C-158

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PRESSURE FILTERS ◆ ION & HEAT EXCHANGERS ◆ WASTE-TREATING EQUIPMENT

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the whole field of high-energy fuels for rockets, missiles, and planes has made it inevitable that acetylenic derivatives containing high-energy triple bonds would be considered for such purposes.

While the security restrictions to be expected on this subject add to the difficulties of evaluating the work being done, it is apparent, from such sources as the patent literature, that both United States and Russian research efforts have gone into synthesizing and evaluating acetylenic fuels.

At this stage it is impossible to judge the future for such products.

The only point which can safely be made is that this potential use must not be overlooked and, if ever commercialized, will afford another vast new market for acetylene derivatives. ■

Motivations study analyzes actions of engineers

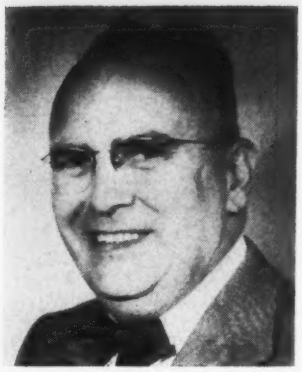
What causes an engineer to select one company over another, change jobs, or put forth maximum effort on the job?

Answers to such questions were sought in a recent study conducted by Deutch and Shea, Inc., technical manpower consultants.

The study was designed to help companies improve their appeal as employers of technical men, and to better utilize the engineers they now employ.

Results showed that comparative salaries, opportunities, interest of work, advancement, job security, responsibility, and professional recognition all play an important part in creating a work climate conducive to high creativity and efficiency. The order of importance however, varies considerably with the kind of engineering work being done.

(To obtain complete study, "Motivating Factors in Engineer Employment" remit $7.50 direct to Industrial Relations News, 230 W. 41st St., New York 36, New York.)



E. C. Medcalf joined American Cyanamid 25 years ago this year. After receiving his masters degree in Chemistry from Indiana University, he joined Cyanamid as a student trainee, and successively became a research chemist, group leader, and chief chemist in process development.

In 1952, Gene Medcalf was made manager of the Coal Tar Chemicals Department. Two years later his duties were expanded to include purchasing of coal chemicals for the company.

He is a member of the American Institute of Chemical Engineers and the American Chemical Society. He is married and has both a son and daughter.

WHAT'S HAPPENING TO COAL CHEMICALS?

GENE C. MEDCALF, Manager
Coal Tar Chemicals Section
General Purchasing Dept.
American Cyanamid Co.

SEVENTEEN years ago, all aromatic chemicals were made by the coal industry. Each year since then, the petroleum industry has become an increasingly more important factor in their production. Unfortunately for the coal chemical industry, the output of aromatic chemicals from coal is tied in — **not** with the demand for these chemicals — but with the level of coke production, used in steel-making operations.

Some puzzling economic problems arise from such a situation.

Sales and Profits

Profits for most coal-derived chemicals were poor last year, and there is little indication that they will improve in 1958.

On the other hand, the **petrochemical** industry is bullish concerning benzene.

At least six major oil companies have, or will bring onstream during 1957-58, units to produce B-T-X (benzene, toluene, and xylenes). They may find, though, that there is too much capacity for making toluene and xylene.

Take, for example, benzene. Petroleum-derived benzene now supplies 40% of our country's requirements. Petroleum-derived toluene and xylene account for over 80% of total US production.

All this production uses only 7% of the refineries' catalytic reforming capacity. (The other aromatic production goes into gasolines to boost their octane numbers.)

Benzene demand was strong from late 1954 until mid-1957, when some major styrene producers began to cut inventories. Additional pressure was applied by large importations of benzene from Eastern Europe.

Through the first half of 1958, supply will probably continue higher than demand. But the longer-term outlook looks bright.

Toluene, too, had rough going in 1957. Explosives and aviation gas demand decreased, and the solvent market was soft. Growth of the high-octane automobile gasoline market was insufficient to take up the slack.

An abortive price increase was short-lived. The price quickly sought its level just above its value as a gasoline additive.

In Western Europe, demand is above production, and Germany and Holland are two of the leading importers. Russian toluene is said to be competing for this business, but if it is made primarily from coke oven operations, it is doubtful if it can be a significant factor in the market.

Mixed xylenes are good as gasoline components and as solvents, and should also have a bright future as chemical intermediates. The three isomers — ortho, meta, and para — are commercially oxidized to make the corresponding dibasic acids: phthalic, isophthalic, and terephthalic. These find use in alkyd resins, polyesters, films, plasticizers, fibers, dyes, and pharmaceuticals.

Naphthalene is still made commercially only from coal, but the petroleum industry is developing a synthetic process.

Naphthalene is second only to B-T-X as a coal-derived chemical. It is the raw material for phthalic anhydride, used in protective coatings, plasticizers, and dyes.

Prior to 1955, practically no producer kept sufficient inventories of naphthalene. Growth in the phthalic anhydride market made naphthalene demand surge, and production was outstripped. A chaotic price situation resulted both here and abroad.

The unstable supply-price situation encouraged the petroleum industry to work on a naphthalene-synthesis process. Two processes are now emerging from the engineering stage. This might minimize the importance of coal tar naphthalene as a raw material.

The coal-tar producer can protect his market by keeping sufficient inventories to handle customer requirements.

Phthalic anhydride capacity in the US is sufficient, right now, for all forseeable growth through 1965. Yet with industry operating at only 60 to 70% capacity, new phthalic anhydride units are still being built. Europe, on the other hand, does not have a surplus, and they are building additional facilities.

Practically all other coal-derived chemicals have been in ample supply during the past three years as a result of the sustained high level of steel operations throughout the industry.

The future of coal chemicals will be directly influenced by the research in this field. Fortunately, the last decade has seen a big increase in research on the separation and use of coal chemicals.

Coal Industry Research

Koppers Company has started a development unit to seek new uses and new processes for coal chemicals. Pitt-Consol Chemical Company opened a new cresylic acid plant using a very different process for recovery and purification of cresylic acids.

Barrett Division has started a new anthracene plant. Research on coal hydrogenation continues, even though it is agreed that a commercial plant is still some years in the future.

An interesting development was the recent opening of the first domestic plant for hydrogen refining coke-oven benzene. Patterned after the conventional hydrogen refining process of the petroleum industry, this Jones and Laughlin plant is producing benzene that is second to none.

U.S. Steel is also scheduled to start a plant early in 1958. This refining unit is licensed by Koppers, and incorporates the Schloven-process refining procedure with U.O.P's Udex process.

The extreme purity of petrochemical-derived benzene forced this move. It is believed that one

or two other steel companies may decide to install hydrogen refining during 1958.

Smaller companies may elect to sell their benzene to the less demanding consumer, but they will probably have to take a lower price.

New Uses and Processes

Development of new uses and improved processes for coal chemicals by any one producer strengthens the whole chemical field. In England, research is done cooperatively by the coal tar producers.

In this country, research work is done by the individual companies. The research programs carried on by the coal chemical companies are competitive with each other and competitive with the petroleum industry. This competitive research, while at times seeming wasteful, nevertheless tends to produce more and better products and processes than work done by a single group.

Forecast

Coal-derived chemicals are produced by carbonization of coal in byproduct ovens, which in turn is closely related to steel production. Steel operations have been at a high level these past three years, keeping these chemicals in long supply. Whether this position will continue through 1958 depends on the steel operating rate.

A trend that tends to balance the effect of increased steel production is the long-term decline in the consumption of coal required to produce a ton of steel. It is due to more efficient steel mill operations, and is a trend that will no doubt continue.

On the other hand, more efficient distillation of coal tar has increased recovery of coal chemicals. For example, in the period from 1947 to 1954, about 48 pounds of naphthalene were recovered per 100 gallons of tar. In 1955 this figure stood at 76 pounds. Quality-wise, this naphthalene was of better grade. In 1955, 70% was over 76° grade. In 1951, only 40% was over this grade.

The combined effect of all these changes will probably

An Elegant New World

Formulated with **ADM's** Fine Oleyl Alcohol....

(Cosmetic and Pharmaceutical Grade)

Adol 85

Here is the finest oleyl alcohol on the market today —new Adol 85 from Archer-Daniels-Midland. Its arrival gives you new, yet economical, ways to add important sales features to a broad range of cosmetics and pharmaceuticals.

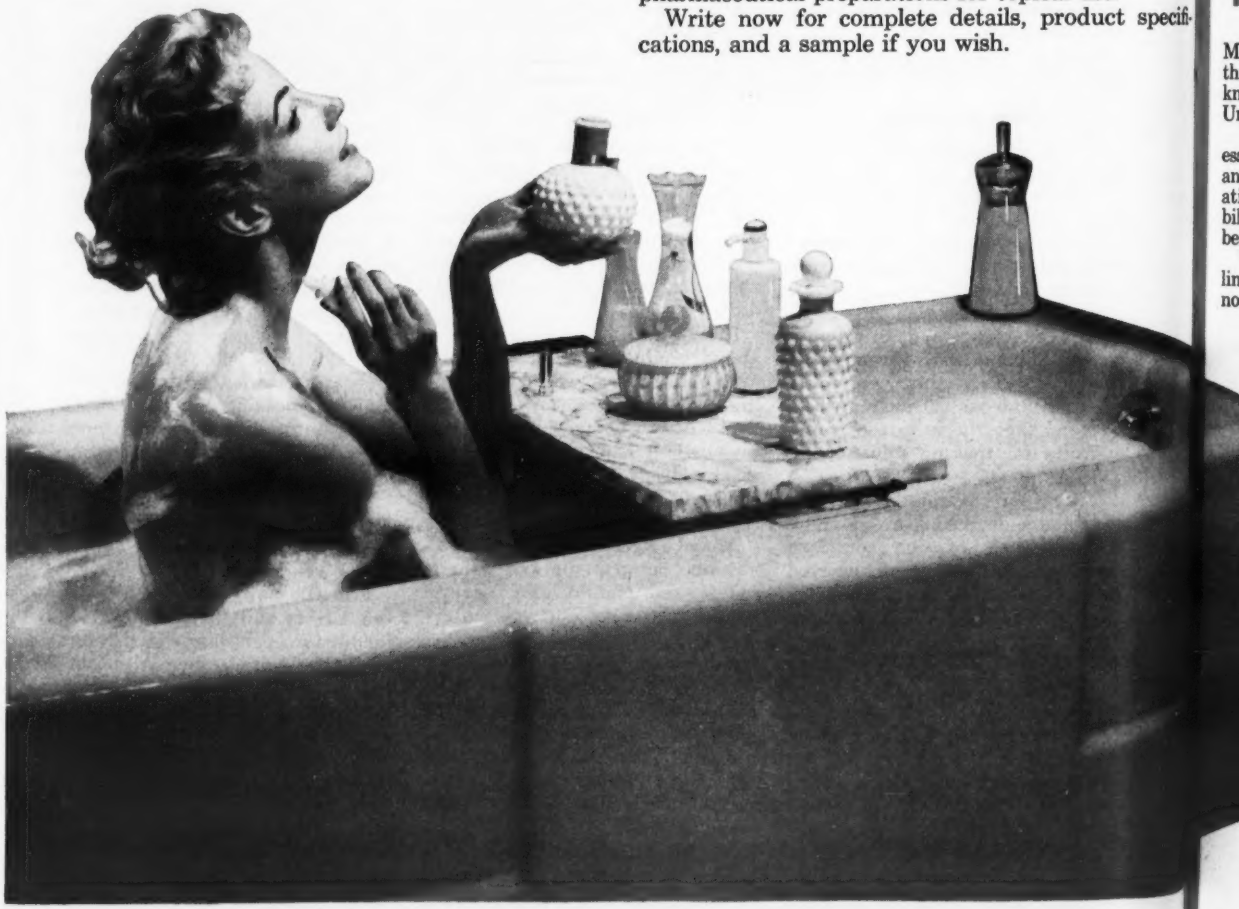
Adol 85 was tailored for use in areas where the best never before has been obtainable except at prohibitive prices. Now a new manufacturing process produces oleyl alcohol of unusually high quality . . . but in a practical price range!

Here are a few Adol 85 features: light color, remarkable lack of odor, stability against oxidation and rancidity, resistance to hydrolysis, extreme mobility, superb plasticizing qualities, compatibility with nearly all waxes and emulsifying agents commonly used, and active penetration into capillary (and even sub-capillary) crevices.

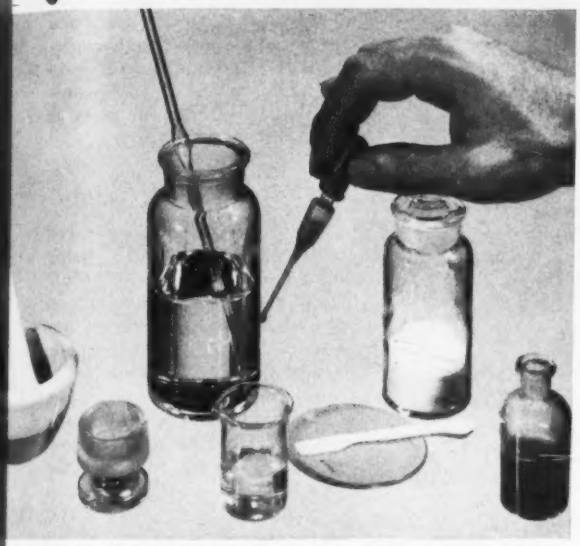
In addition to these features, Adol 85 contributes important aesthetic advantages to cosmetics. It produces a remarkable, pleasant, new "feel" in preparations applied to the skin. It improves ease of application, leaves no sensation of excessive wetness or gumminess, and imparts to the skin a feeling of smoothness, freshness, and suppleness which lasts and lasts.

You should get acquainted with Adol 85. Quite likely it offers you a way to take a big step ahead in formulating skin oils, bath oils, hair preparations, cream rinses, hair lacquers, mascara, lotions, sun tan oils, anti-perspirant creams, lipstick, and emulsified pharmaceutical preparations for topical use.

Write now for complete details, product specifications, and a sample if you wish.



d of Beauty!



Polyunsaturated Fatty Alcohols

Most pharmaceutical and cosmetic men are familiar with the essential unsaturated fatty acids. Too few, however, know about the polyunsaturated fatty alcohols—ADM's Unadols 400 and 900.

These offer a way to overcome shortcomings of the essential unsaturated acids, especially in pharmaceutical and cosmetic uses. Unadols have the molecular configuration of the fatty acids, but impart greater product stability, more resistance to rancidity, easier handling, and better emulsification properties.

The Unadols are based on linoleyl, arachidonyl, and linolenyl unsaturated alcohols. Considered digestible and non toxic, they offer ways to formulate pharmaceutical, cosmetic, and nutritional products which are improvements over those made from corresponding free fatty acids. They should add shelf life, palatability and neutral pH characteristics to many formulations.

A limited number of people have worked with the Unadols and like them, but, frankly, about all ADM can do at this point is tell you about them and hope your curiosity and desire for something better will spur you on to write for specifications and evaluation samples.

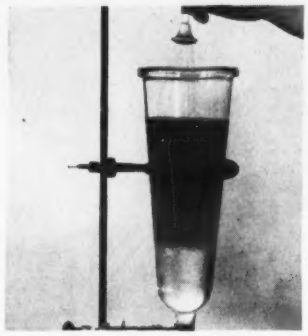
ADM PRODUCTS: Linseed, Soybean and Marine Oils, Paint Vehicles, Synthetic and Natural Resins, Fatty Acids and Alcohols, Vinyl Plasticizers, Hydrogenated Glycerides, Sperm Oil, Foundry Binders, Bentonite, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa, Livestock and Poultry Feeds, Olefins and Hydrocarbons.

The Research Chemists' Corner

Spray bath for oils

Here is a real time-saver when you need to wash large quantities of oil with water, or when alkali refining oils in the lab. ADM researchers use a standard large-size percolator and a small spray head. Water or dilute alkali of desired temperature is sprinkled through the oil. Excess water is drained from the bottom of the percolator without disturbing the oil.

Users say this technique is an improvement over separatory funnels. They say the fine spray brings water into intimate contact with oil without agitation. Large batches (up to 3 or 4 gallons) can be processed at one time, oil is not likely to form an emulsion, and there is no heavy, fragile funnel to lift. Hands need not touch the apparatus, reducing danger from hot solvents, oils, or chemicals.



Can unique Behenic Acid also help solve your new product problems?

The pedigrees of several profitable new products now on the market include a little-known ADM product—Behenic Acid. Behenic is a saturated C-22 chain length fatty acid. It is the longest chain fatty acid from natural fats or fatty oils commercially available. As far as we know, only ADM has it for sale.

When used in emulsions or solutions, Behenic Acid holds things together with the zeal of a marriage counselor. It adds stability to certain products used in the graphic arts industry. It is used as an opacifying agent and stabilizer in such things as cream shampoos. A recent discovery shows that Behenic Acid derivatives form wax-like esters with silicones, giving the cosmetics industry some intriguing new solid silicone products to tinker with instead of being restricted simply to liquids.

Behenic Acid is a white, waxy, almost odorless crystalline solid at room temperature. It can be esterified with fatty alcohols (we sell these, too) to produce high melting point waxes. In oil systems, it prevents separation. And because Behenic Acid stabilizes emulsions, it is a good bet for soaps, lotions, cosmetics, lubricants, esters, and chemical intermediates.

Behenic Acid may be just what you need to develop interesting new products. Write us for more information and samples.

Archer-Daniels-Midland

CHEMICAL PRODUCTS DIVISION

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Chemifats from Nature's Wondrous Warehouse

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mean that coal-derived chemical production will increase at a slightly slower rate than any increase in steel production. Over the next five to ten years, this could mean an increase in coal-derived aromatic chemicals of not over 15%.

These figures are bullish for the future of coal chemicals, since the chemical industry is expected to expand at a faster rate than 1.5% per year.

Regardless of the fact that the petrochemical industry is today dominant in many areas which were formerly considered the domain of the coal chemical industry, it is nonetheless true that from a longer-term view the large reserves of coal and lignite will be a major factor in providing carbon for the manufacture of chemicals.

The research work now required to support the processes for coal-derived chemicals will also be providing the technology required in the future to commercially exploit the chemicals from low-temperature carbonization and coal hydrogenation, and thus favor the long-run outlook for coal chemicals.

(Digested from a paper given before the American Coke and Coal Chemicals Institute, Chicago, Illinois.)

Leasing

From page 30

Leasing can offer other possible advantages — but these usually involve special situations. Some companies would like to convert fixed assets into current assets. This may be accomplished by selling the asset and leasing it back.

One very recent case concerned a chemical company whose sales and profits had expanded rapidly. To handle sales volume the company had expanded its plant facilities. In the process, too much working capital was used, with the result the company found itself in a tight "current" position.

The company's problem was solved by selling $500,000 of its plant equipment. This equipment was in turn leased

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To Help Make Your Plans Work As Specified...

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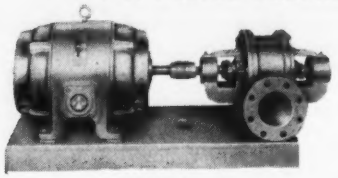

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condensate return
hot and cold liquids
chemicals
refrigerants, etc.

Up to 200 gpm., pressures to 900 ft. High pressure at normal operating speeds. Handle widely varying heads with little change in capacity. Sizes 1¼" through 2½".

F-M BUILTOGETHER CENTRIFUGAL PUMPS

hot and cold liquids
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Up to 900 gpm., pressures to 525 ft. Close-coupled pump and motor units mount horizontal, vertical or angular. Sizes ¾" through 5".

The best-laid plans can go astray when mechanical equipment fails to deliver according to expectations or fails to give sustained peak performance. That's why Fairbanks-Morse builds something extra into all pumps so your plans work *as specified.*

F-M Pumps You Can Rely Upon

Full-rated capacity guaranteed...with built-in safety margin to assure maximum efficiency under most severe use. Rugged, durable, precision-made to maintain efficiency with minimum service.

Expert Help When You Want It

F-M Engineers are ready to work with you on any of your pump problems.

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plant waste
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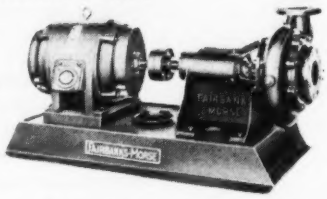
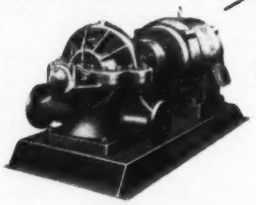


Up to 30,000 gpm., pressures to 175 ft. Sizes 2" through 20". Vertical or horizontal. Bladeless or conventional.

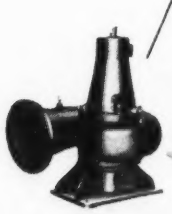
F-M SPLIT-CASE CENTRIFUGAL PUMPS

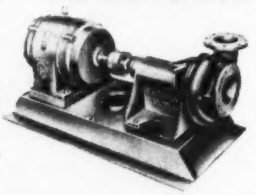
water supply; plant service
booster; circulating
air conditioning
refrigeration
chemical liquids
boiler feeds, etc.



Up to 50,000 gpm., pressures to 700 ft. Sizes 1½" through 36". Single stage or multistage.

F-M END-SUCTION PUMPS





hot and cold liquids
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Up to 100,000 gpm., pressures to 250 ft. Sizes ¾" through 54". Horizontal or vertical.

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back to the company at a rental cost of $10,417 per month for 60 months.

The effect on the balance sheet was quite startling, and the company's current working capital requirements were well satisfied. The accompanying balance sheet on page 30 shows the results.

Other Special Situations

Other companies are faced with competition that is using the latest equipment while they are lagging behind on cost-saving devices. Here acquisition of new equipment is a must, but financial ratios may not permit purchase, either outright or on conditional sales contract, or even bank borrowing to make the purchase. Leasing offers a

To page 231

Allied and National Cylinder Gas Effect Name Changes

The two most recent results of the apparent corporate name unrest in the chemical industry have been announced. Allied Chemical & Dye Corporation becomes simply Allied Chemical Corporation, and National Cylinder Gas Corporation makes a complete change and becomes Chemetron Corporation.

According to Chemetron president Charles Haines, "The previous name had been satisfactory while the concern produced only industrial gases and gas equipment, but addition through the years of many new product lines and services had made the name too 'restrictive'."

Allied's change, president Glen Miller explained, was because, "The board of directors believes that the new name will more clearly reflect the broad nature of the company's position in the chemical industry and will not single out a particular division of field of activity." He made clear, however, that the change "in no way implies lack of interest in our dye business."

Pennsylvania Industrial Chemical's recently completed hydrocarbon resins and aromatic solvents plant at West Elizabeth, Pa.

Pennsylvania Industrial Chemical Corp. has put its new hydrocarbon resins and aromatic solvents unit on stream at West Elizabeth, Pa. This is the third such plant for the company, supplying materials for the paint, rubber, other chemical processing industries.

Major construction is underway on Freeport Sulfur's $119-million nickel-cobalt operation due for completion next summer. The plant will produce an annual 50-million pounds of nickel and 4.4-million pounds of cobalt from ores mined and concentrated at Moa Bay, Cuba, and refined in Louisiana.

Du Pont has announced plans to build new facilities to produce an annual 56-million pounds of Dacron polyester fiber on a site adjoining its rayon unit at Old Hickory, Tenn. The new unit will produce both staple and filament products, with first operation scheduled for mid-1959.

Dow has built its own marine terminal at Bay City, Michigan, to handle traffic from the St. Lawrence Seaway development. The facilities were scheduled for operation with the first Great Lakes traffic of the year.

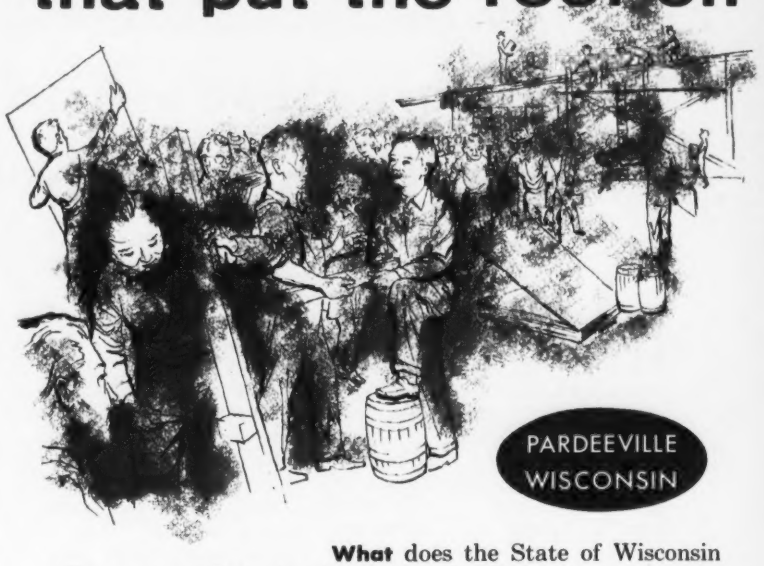
Chemetron Corp. (Nee National Cylinder Gas) announces a 150 percent expansion of its Chicago liquid oxygen plant, as well as expansion or new projects at five other locations. The five: A hydrogen plant at Huntsville, Ala.; an oxygen and acetylene plant at San Juan, P.R.; doubled oxygen capacity at Maracay, Venezuela; an oxygen plant at Puerto Ordaz; and completion of an LOX unit at San Leandro, California.

Pennsalt is nearing completion of expanded hydrofluoric acid facilities at the company's Calvert City, Ky., site.

Ethyl Corporation's vinyl chloride monomer unit is now in operation at its Baton Rouge manufacturing center.

Polyethylene expansion plans at Texas Eastman have been announced. Contract with Girdler Construction calls for boosting capacity to an annual 85-million pounds by end of this year. This is the third expansion for the company's Longview, Tex., plant.

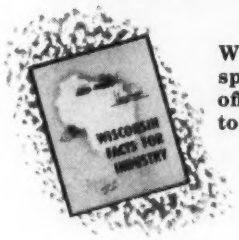
the town that put the roof on



What does the State of Wisconsin offer to up-and-coming industry? You'll find one answer in the village of Pardeeville (population 1100) where they make the big electric scoreboards you see in every major league ball park—from Milwaukee County Stadium to Yankee Stadium.

Three years ago, All-American Scoreboard Corporation began to outgrow its original Pardeeville plant. Neighbors in town saw what was happening. They got together and raised $80,000 to finance a new factory. Then, when construction lagged, the community took the initiative again. A crew of 100 volunteers took a day off from their stores and offices to put a roof on the building. They nailed down 30,000 board feet of lumber in seven hours!

In Pardeeville, as in other Wisconsin towns, folks seem to know how to get important jobs done. *Everybody pitches in!* Call it community spirit. Or call it good-neighborliness. By any name, it's an asset Wisconsin people have and to spare. *No wonder this triggers industrial progress!* National and local firms are currently investing more than $150 millions in Wisconsin plant expansions.



Write for Wisconsin's Industrial Fact Book and special report on the advantages Wisconsin offers Chemical Manufacturers. Address inquiry to Robert Koob, Governor's Office, Madison.

Division of Industrial Development
Governor's Office
Madison 2, Wisconsin

WISCONSIN did

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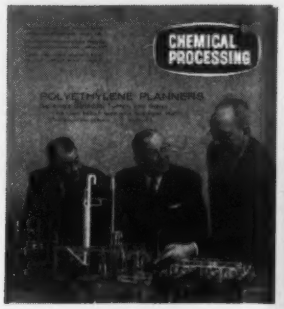
Bakelite Latest — And Strongest — To Join High-density Battle



COVER STORY

High-density polyethylene producers, long steeling themselves for the event, are about to be met with their toughest competition yet — Bakelite's new linear polyethylene operations. The company's one-two punch — it's bringing in both a Ziegler and a Phillips process unit — will allow Bakelite salesmen to offer resins with a full range of densities, from .915 (conventional resins) to.96, from one order book.

Additional high-density polyethylene capacity isn't really news these days — unless it happens to be Bakelite's capacity. Here's why: Bakelite now has something close to 1/3 of the total US polyethylene market and obviously has no intentions of losing that position. And while the opening of its low-pressure plants comes a year or so after some of the competition (Grace, Celanese, Phillips, Hercules) Bakelite isn't really that far behind. Almost a million pounds of the material have been produced over the last year or so for development work and evaluation by both Bakelite and its customers. (Other high-density producers did the same kind of development work but largely with resins produced by associated — in one way or the other — companies using the same processes.)

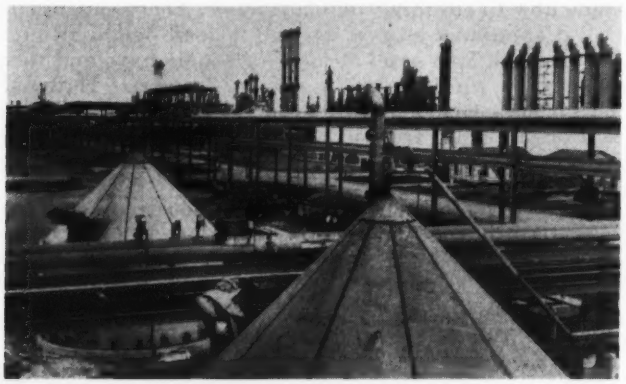
Vital statistics on the operations: Locations, Institute, W. Va. (the Ziegler plant) and Seadrift, Texas (the Phillips unit); capacity is 30 million annual pounds of Ziegler material and 25 million for the Phillips resins; and while Bakelite doesn't talk plant costs, the going price for high-density polyethylene units is on the order of $10- to 12-million per plant.

The processes, while probably undergoing some Carbide polishing, are largely the same as other Phillips and Ziegler producers are using. (This is, of course, more true of the Phillips unit than of the Ziegler plant. Phillips sells its licensees a whole package, including catalyst system, plant design data, and operating know-how; the Ziegler licensee gets little more than a do-it-yourself project, guided by Professor Ziegler's million-dollar instruction book.)

No New Process

This may come as a surprise to some: Speculation was that Carbide might have bought both packages for the know-how involved and for protection in the patent clinches — and then come up with its own hybrid process. This wasn't the case, and Bakelite president R. K. ("Check") Turner explains why both units were brought in: "Although we were interested in looking at both processes to see what they could do, and perhaps if it had proved practical we would have developed our own process, other justification for the use of both methods presented themselves. The Ziegler unit, we feel, is more readily adaptable to production in the .95 range, while the Phillips resins are produced in the ranges to .96. This is part and parcel of our plans to offer the whole range of materials to the customer."

Other producers — using either of the processes — may scream loud and long at this sales pitch, but Carbide isn't known for throwing good money after bad, and spending additional millions for the second plant for no better reason than the fact that it owns a second process isn't standard



Phillips unit at Seadrift, Tex., will be on stream soon, can produce an annual 25 million pounds of resin

Bakelite's J. D. Benedito, vice president-sales, R. D. Glenn, vice president-development, and president R. K. Turner plot course into stormy polyethylene seas

Highly instrumented plant at Institute, W. Va., is the second US Ziegler unit (first was Hercules) to go into operation

Carbide operating procedure.

As If Things Weren't Tough Enough—

Where is the additional capacity going? Grace has 50 million pounds, Hercules can supply another 30 million, Phillips is reportedly able to supply up to 75 million, Celanese has a capacity of 40 million pounds. Koppers' 30-million-pound plant should be running soon, Du Pont is presumably going ahead with its linear resins plant, and while Dow is close-mouthed about its upcoming capacity it should be on the order of 30 million additional pounds. (To this should be added Allied's high-molecular-weight material that is making a big splash now only in pipe, but Allied has announced a material, already being tested with some customers, for use in film, sheeting, and molded products. Almost nothing is said about the process but the company claims that it "would require a much smaller capital outlay per pound of capacity than other processes.")

With confidence born of past success, "Check" Turner has a ready answer for that one too. "We feel that these latest high-density polyethylene resins possess a combination of properties which will create a completely new plastics market. Of course, they will also command a share of the current market, including perhaps 10 to 15 percent of the conventional polyethylene sales."

(Turner's evaluation of high-density's share of the market may be considered rather conservative. A recent Arthur D. Little study of the field placed high-density polyethylene sales in 1961 at about 350 million pounds — about 35 percent of the billion-pound annual polyethylene sales that are expected to materialize about that time. However, curiously enough, when Turner's figures are scaled down to Bakelite's portion of the total

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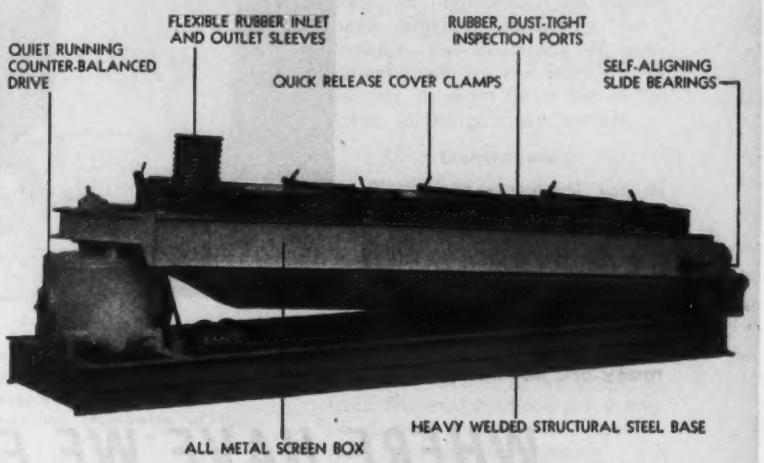
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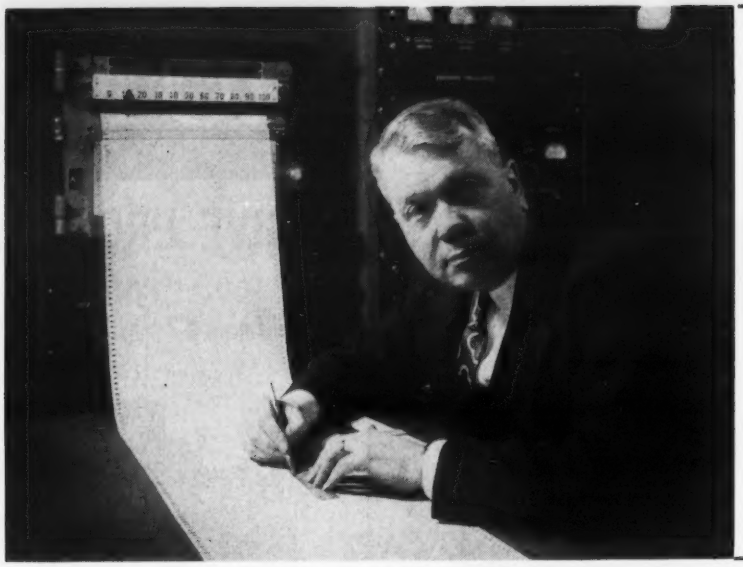


A distinguished educator and talented scientist, Dr. Harold C. Urey of the Enrico Fermi Institute, University of Chicago, is well-known for his contributions in many fields.

Recipient of many honors, including that of Nobel Laureate for his discovery of heavy hydrogen, Dr. Urey has devoted his life to asking the question, 'Why?', and finding an answer.

Staff editor William Clarke of CHEMICAL PROCESSING interviewed Dr. Urey concerning his views on education and science in the United States — as compared with Soviet Russia.

Photo by Hedrich—Blessing

Our schools today are not all bad — but many are not doing their job.

WHERE HAVE WE FAILED IN EDUCATION?

An exclusive CP interview with DR. HAROLD C. UREY, University of Chicago

Q: Many people, alerted by the implications of the Russian satellites, have suggested a comprehensive survey is needed of our human and material resources. Do you think we need such a survey?

A: The need for a survey is not the problem. The problem is to drum into the heads of the administrators of our secondary schools and teacher colleges that for a half century they have been doing a bad job — a progressively bad job. They do not like to accept this and are not willing to change their point of view. This is our problem, not the need for a survey. We already know what the facts are.

Q: How should we go about improving education in the United States? What guide posts should be used in evaluating this new approach?

A: One statement can be made immediately. We cannot expect to have the value of the dollar go down continuously — decade after decade — and yet secure the same education for the same price as we did previously. The amount spent on education has lagged enormously.

In order to overcome this lag, I believe we should double the education bill of the United States. The Federal government, the state governments, and the local school boards should be spending approximately double the present amount (some of my friends say they should be spending triple).

In the first place, we do not have enough school rooms, or even enough school teachers. In the second place, many of our school teachers are teaching 40 and 50 students in the classroom. I do not believe any teacher can do a good job with more than 25 children. When we remember that a substantial fraction of our classrooms have many more than 25 students, this means an increased number of teachers and classrooms.

As soon as a teacher has more than 25 children, she frequently will not know the names of all her children. She does not know them personally and they do not know her personally. Principally, she becomes a person who keeps order in the classroom — a monitor with no time to teach. She cannot correct her pupils' work carefully and cannot look after them individually at all.

Most of our teachers are paid too low a salary. It is not possible to attract into the teaching profession in the United States the intelligent people needed to teach children without paying them an adequate salary.

Q: The school board in Winnetka, Illinois, stated recently that it wished to pay their beginning grammar school teachers $8000 a year. The board saw no immediate possibility of doing this. Is this an adequate salary?

A: This is in the range that must be used for experienced teachers. Many people will begin teaching at a more moderate salary so long as there is a prospect of its rising to an amount sufficient to bring up a family in reasonable comfort, and providing they can move in their community to a position of respect as a valuable person of the community. You must remember, one of the important things in attracting young people to a profession is not just the immediate salary but the ultimate salary.

Q: Is money the only necessity?

A: There is another side to it. Money alone does not do much. Ideas are needed. We must get rid of the idea that we're just teaching children and it is unnecessary to teach a subject. We should try to teach subjects to children and stop this nonsense about trying to "develop personalities."

An illustration of this came recently to me: a class in co-ed cooking in high school. Some boys were taking it. As far as I'm concerned, no child of mine, no boy of mine is going to take a course in co-ed cooking. Things of this sort are the prerogative of parents.

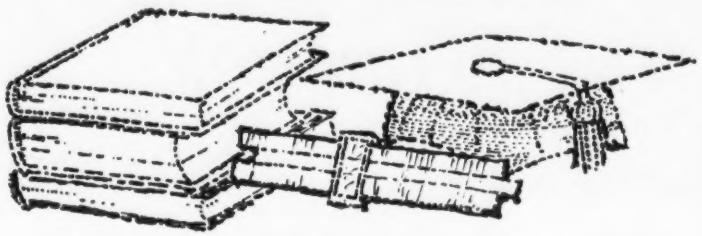
One of the very important qualities of a personality is that a person knows something definitely . . . and is able to reason in a mature manner about that subject. A mature idea requires a long period of education. The well-trained person is expected to go through approximately 20 years of education before he is finished. Fifteen years is considered a minimum for getting reasonable knowledge of what the world is like.

Federal Support of Education

Q: Must the problem of Federal government support be solved before the education problem is solved? Can private schools do the job that is necessary?

A: There are two problems here.

EDUCATION FOR TODAY



Without attempting in any way to be impartial, CHEMICAL PROCESSING is presenting this interview with Dr. Harold C. Urey and the article by Admiral H. G. Rickover (on the next page) on the subjects of education, science, and the well-being of the United States.

For the tax-payer, there's unwelcome news in Dr. Urey's conclusion that school boards and state and Federal governments should double their expenditures on education.

For the parent, there is the statement that discipline problems in the high schools attended by his children are hurting their education.

For the advocate of "education for modern living", there is scant consolation in Dr. Urey's comments on "co-ed cooking" courses.

Whatever your reaction to the subjects, you as a member of the technical industries can't afford NOT to read these two articles: Dr. Urey's here, and Admiral Rickover's on the following page.

One concerns private schools, the return on investments, and gifts from wealthy people. These sources of income have been diminishing because of the income tax laws of the United States. Consequently, I do not believe that there is any way to support higher education in our private schools except through the government. The same applies to our state schools which are directly state-supported.

Second, salaries in our state schools are inadequate as compared with our private universities. This seems to be because the electorate is unwilling to see intelligent people, who have spent a long time acquiring knowledge and abilities, being paid an adequate amount. Somehow or other, we must impress the people of the United States with the importance of intellectuals in all fields, and their great value to a democratic country.

Q: Fields other than just science and engineering?

A: Of course. Everything.

Our Graduate Schools Are Good

Q: What is good about our secondary schools? Colleges? Graduate schools? There has been a lot of criticism about our secondary schools.

A: Let me start with the graduate schools. I believe they are largely in very good condition. I think they are greatly respected abroad. We have visitors in our graduate schools from all the countries of Western Europe and South America, the Far East, and Australia. Many Indian students come here for work. They could also go to England. Our graduate schools may have faults, of course, as any human institution has faults, but they are in good shape.

When it comes to colleges, I think these are less satisfactory. I believe that we are taking too many people into our colleges — or at least the people we are taking include some who should not be there. This is over-crowding our colleges and requiring us to call something a college education which would not be so termed a relatively short time ago in this country.

It's just not possible to bring all of the population of a country such as the United States into our colleges and maintain the same standards as in the past. Perhaps we should have colleges and technical schools, admitting quite frankly that the technical schools are teaching typists, scientific technicians, and mechanics. Education of this kind is worthwhile but it shouldn't be called a college education.

Discipline Problems Hurt High Schools

The situation is far worse in our secondary schools. We have laws that children shall go to school until they are sixteen or eighteen. Our high schools have become places where teenagers spend their days largely in idleness because many times they will not work. We have no adequate way of disciplining these children. Corporal punishment may not be used. The teacher cannot tell the child to go home, because the law says he must stay in school. I think there is no doubt that there are real blackboard jungles in the United States at the present time.

I recently received letters describing these situations. Children are promoted regardless of whether they have done the work or not. Finally, in the seventh or eighth grade, or in high school, pupils are sitting side by side; one, a boy who cannot write his own name or the simplest sentences correctly, the other, a child who knows his work very well. No teacher can deal with this class properly. The teacher can't do his best for the one who can't write his name; certainly, he cannot do the best for the gifted child.

Intelligent Child's Right to Education

We simply must recognize that the fraction of the population with high IQ's have rights too. They have a right to an education which is the best for them that we can provide. It isn't only the retarded child who should be given special education commensurate with his abilities. The intelligent should receive this attention also. They should have rights in this country, and, moreover, they are of far greater benefit to the community than the retarded child after they are educated. I beileve this problem of our secondary schools is the most serious one we have to face. It also extends down through the grade school.

Foreign Language in Grammar School

Q: What should the graduate of a primary school know?

A: It is a little difficult for me to say. He should have begun the study of foreign languages, and completed his arithmetic, (good arithmetic, not superficial stuff at all). Perhaps he should be working on algebra by that time. In high school he should have algebra, geometry, and, perhaps, the beginning of analytical geometry and calculus. To do this, he must finish his arithmetic in the primary schools.

Examinations

Q: You have suggested use of regional examinations for students. Would you suggest using state-wide examinations for high school instructors on a subject basis?

A: Rules and regulations won't in themselves do us any good. What we need is better preparation. The examinations are a way of finding out whether people have had this preparation.

When I was a child in the country grade schools of Indiana, my examinations were sent out by the State Department of Education from Indianapolis. In this way a very serious effort was made to see whether we understood what was expected of us in the course of study. I taught one year in Indiana and administered these examinations as a teacher. These no longer exist, and I believe that this was a retrograde step.

Don't miss "Educating for Extinction" by Admiral H. G. Rickover, USN — next page

Q: Do you know why they were eliminated in the State of Indiana?

A: No, I do not know why. It is completely consistent with the deterioration of the standards in our schools in the last 40 to 50 years.

Retarded Children and Gifted Teachers

Q: Why has so little attention been given to the gifted child?

A: There is an **enormous** effort to do something for the retarded child, partly due to the fact that the quality of our teachers in this country is not what it should be. The intelligence quotient is

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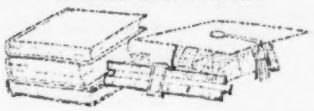
Reader Comments Welcomed

Perhaps you have your own opinions on this vital subject of American education and science. Why not send them to us? Write: The Editor, CHEMICAL PROCESSING, 111 E. Delaware Pl., Chicago 11, Illinois.

EDUCATION FOR TODAY



Where are our engineers and scientists of tomorrow to come from? We face a real crisis — not of manpower, but of brainpower.
To continue as we have can be disastrous . . .
right now we may be . . .

Admiral Rickover serves as Chief, Naval Reactors Branch, Division of Reactor Development, US Atomic Energy Commission; he also serves in the Navy Department as Assistant Chief of the Bureau for Nuclear Propulsion. He is considered to be the 'Father of the Atomic Submarine.'

EDUCATING FOR EXTINCTION

REAR ADMIRAL H. G. RICKOVER, USN

The United States has recently undergone a period of rude awakening. Russia has had extraordinary success in translating her educational system — all but in ruins 20 years ago — into a most efficient machine for producing highly competent scientists and engineers.

We are slowly realizing with bitter disappointment and humiliating truth that a 19th-century educational philosophy is as hopelessly outdated as the horse and buggy.

Nothing short of a complete reorganization of American education, with a reversal of educational aims, can equip us for winning the educational race with the Russians.

Did you read Dr. Harold C. Urey's comments on American education and science? Turn back to the preceding page

This is proven when a country — 75% illiterate a generation ago — can catch up with us within 20 years in such important fields as science and engineering.

Let me condense this criticism to a few points. For greater details, I can think of no better source than the hearings on the "Shortage of Scientific and Engineering Manpower", held in April and May 1956 before the Subcommittee on Research and Development of the Joint Committee on Atomic Energy of the Congress of the United States.

Another source helpful in overcoming our educational stagnation will come from the Preparedness Investigation being conducted by the Senate Armed Services Committee.

In my work in nuclear energy, I became aware of the defects in our school system as long as 10 years ago. Since then I have interviewed more than a thousand young college men and officers.

The design and development of nuclear power plants is a difficult scientific and engineering project. It encompasses the most advanced concepts in physics, mathematics, chemistry, metallurgy, electrical engineering, electronics, and mechanical engineering.

Young men with sound fundamental scientific and engineering knowledge and proper motivation are needed. Despite the numbers who apply, I have never found more than a very small percentage who had the necessary qualifications for our nuclear projects.

I could not but conclude that something was radically wrong with our schools and colleges that had educated these young men.

Our Disastrous Daydream

I think we have come to today's pass because our mass media wrap us in a cocoon of soothing "Couéism" along the lines of "everyday, in every way, things are going to be better and better." Few of us read serious books. We are, therefore, singularly defenseless against the continuous flood of optimistic predictions of a future with delightful superabundance — just around the corner — that American science will provide.

We are equally defenseless against the clichés of our folklore, which assure us that America is and always will be the most technically advanced nation. Or that ours is the most marvelous educational system in the world because more teenagers are in school in the US than anywhere else.

It seems to us that the first step in tackling the American educational problem is to collect all the pertinent data concerning education in other Western nations. Then present it to our people clearly and with dispatch.

I am thinking of the sort of thing done by the Department of Health, Education, and Welfare when it published its recent useful "Report of Education in the USSR." We need all possible information and we need it now.

Of course, no educational system can guarantee that it will bring forth genius at any given rate. It can, however, make it easy for genius to be discovered early, nurtured, and encouraged, and allowed to flower.

Can we truly say that our educational system does this? I think not.

Nor does it even seek out, nurture, and develop mere talent — as contrasted with genius. It fails our most intelligent youngsters in making the best use of their good minds.

Hence we see 200,000 of the top-quarter high school graduates lost each year to higher education. At the same time, the nation suffers an acute shortage of trained professionals in all fields, and a disastrous shortage of vital scientists and engineers.

One of the great defects of our educational system is the considerable latitude allowed the student in selecting subjects, not only in college but even in high school. Because of this, he may virtually bar himself from a given profession unless he has deliberately begun to prepare himself in high school.

For example, we need a great many physicists *now*. But a youngster who has taken no physics and little mathematics in high school, and then takes two years of college liberal arts, is in effect precluded from becoming a physicist.

And yet, in today's rapidly changing technological civilization, it is absolutely essential that students be prepared to study for those professions most needed at any given moment.

One Workable Plan

Prussia was one of the first countries to recognize that a modern state must have a citizenry with at least an elementary education — also that she must have leaders sufficiently educated to deal with the problems of the coming industrialization. Other European countries also adapted the basic principles of this system. These are:

First, that elementary, secondary, and university education be devoted solely to developing the student's intellect to his greatest capacity. All vocational training must be done in special schools.

Second, that secondary schools give a broad general education so that professional study can begin no later than age 18.

Because of wide-spread interest, the above has been condensed from an article in March 1958 POWER INDUSTRY, another Putman publication.

This was necessary both for economy and to find time for compulsory military training.

Third, to get the youngsters ready for professional study at age 18, serious study of foreign languages, higher mathematics, literature, geography, and history must begin no later than age nine, at which time the fast learners begin to be separated from the slow learners.

Fourth, to complete this broad general education in nine years requires carefully thought-out courses for each subject, advancing in logical sequence, from the simple to the complex.

Elective subjects can have no place in such a comprehensive and well-balanced program, below a university level.

Fifth, three basic types of secondary schools gradually evolved and are now provided — the classical, the semiclassical, and the mathematics-scientific. Each type provides a broad enough general education to permit the student to take almost any professional university course.

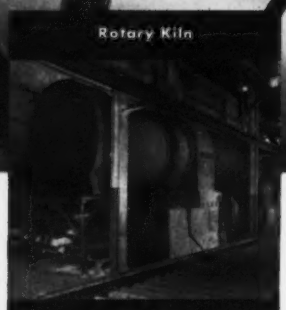
For example, a graduate of the classical secondary school can become an engineer by taking additional mathematics and science courses.

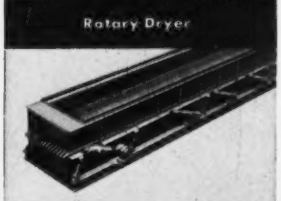
Sixth, considerable latitude is allowed in each school as long as national standards are met. These standards govern the qualifications of teachers and competence of graduates.

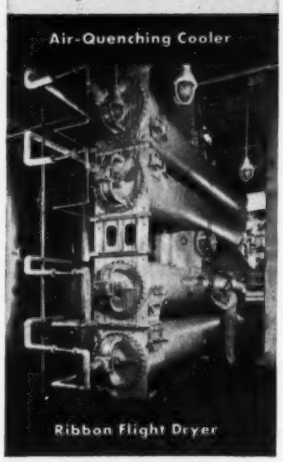
Tests to prove graduates' competence are conducted by authorities external to the school, through comprehensive examinations without which no diploma or degree is granted.

The method is simple. Com-

Before writing or seeing your congressman, PTA, or school board, get a free copy (until the supply is exhausted) of the Joint Committee on Atomic Energy of Congress report on 'Shortage of Scientific and Engineering Manpower.' Write Joint Committee on Atomic Energy, US Congress, Washington 25, D.C.







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bine the European educational system with adequate funds, and motivate children by offering the highest material rewards for hard mental study and you can get the same result anywhere in the world.

The greatest obstacle to a renovation of our education comes from one fact. Control, financing, and direction of education in the US is in the hands of many thousands of local school boards, whose members seldom qualify as educational experts. State control is slight and federal assistance is rejected. We therefore are at an impassé.

It is exceedingly difficult and time-consuming to convince thousands of school boards that they must change the curriculum of the local high school; to persuade 48 states that their colleges and universities ought to confine themselves to education and not to vocational training and service activities.

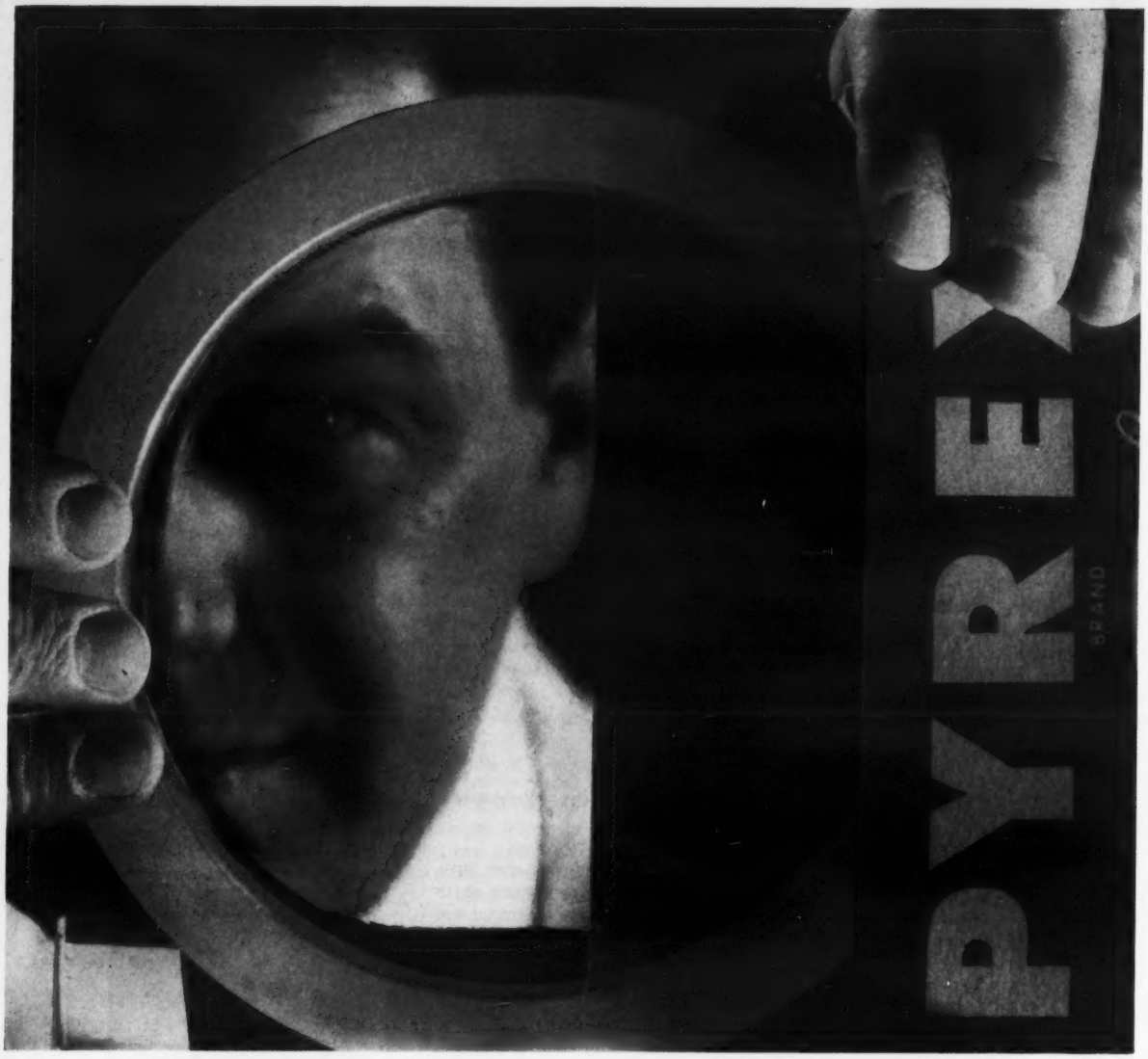
In our own country, the schools have been primarily engines for Americanizing children of diverse backgrounds. The schools teach all children to get along with others whose economic and cultural standards might be different. Our schools develop qualities needed by citizens in a democracy to carry out their political responsibilities. Our schools have accomplished these tasks excellently.

As long as the country devoted all its energies single-mindedly to developing the highest standard of living for the greatest number of people, the kind of education received by American youngsters was entirely adequate. But in pursuit of this aim, we have neglected two things.

First, we have not counted the cost of our high standard of living in terms of rapid exhaustion of irreplaceable mineral and fuel resources.

Second, we have failed to recognize the damage done to our talented children by squeezing them into the straight-jacket of the comprehensive school.

We must devise better ways to educate our talented youth. We cannot spare any child with professional capacity.



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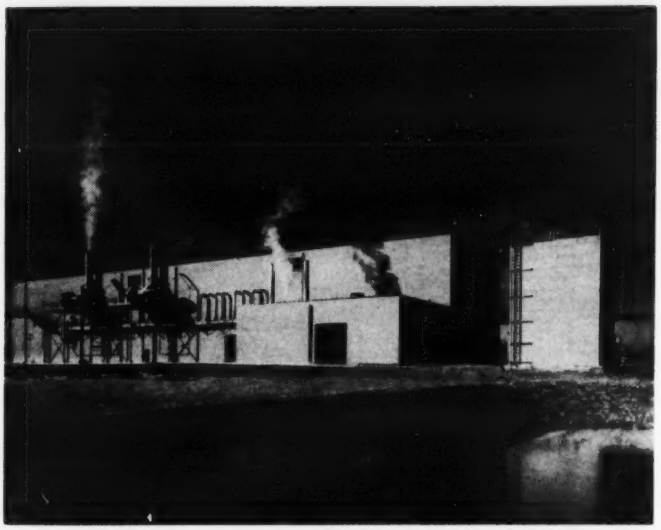
Check 4952 opposite last page

New Capacity, Markets, Pace Growing Reactive Metals Business

Probably one of the most significant industrial developments in recent years, the increased commercialization of the reactive metals — titanium, zirconium, tantalum, columbium, molybdenum, to name a few — is showing signs of even more emphasis in the near future. Recent — and some upcoming — expansions are going to place the metals in an even stronger position to compete with traditional metals.

The most recent expansion in the field has been in tantalum and columbium. Fansteel has just put its new Muskogee, Oklahoma, plant on stream, USI will be "phasing in" production on



Part of Fansteel's recently opened Muskogee, Oklahoma, tantalum and columbium operation. Although the company won't talk about production figures, the new plant is claimed to "increase US capacity of tantalum 50 percent, and columbium 150 percent"

a number of the metals in the near future, and Carbide's Electromet is rumored to be planning further expansion of its existing tantalum/columbium production.

The chemical industry's stake in tantalum and columbium (the International Union of Chemistry has established niobium as correct nomenclature, but US producers and metallurgists still insist on calling it columbium) is a large one from two standpoints. First, while the industry is by no means the largest user of the materials, they represent considerable advancement in process equipment design and such. But the most significant factor is the fact that production of almost all of the reactive metals is largely a chemical process and the list of producers includes an impressive number of the big names in the chemical industry.

The market and capacity for tantalum and columbium — they are mentioned together because production of one always yields the other, like chlorine and caustic production — are pretty hard to put your finger on; primarily because Fansteel, by far the largest porducer, maintains a rigid curtain of secrecy around

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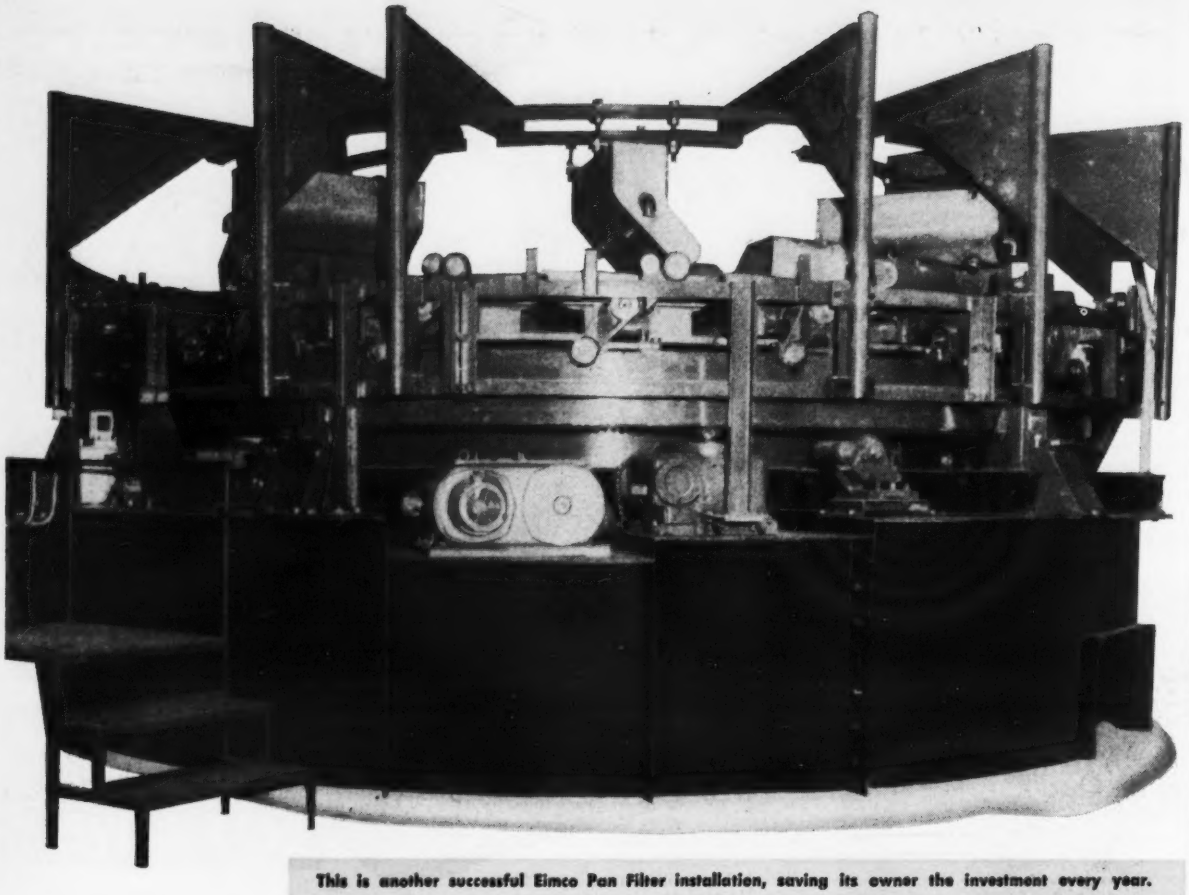
its figures. Yet certain conclusions can be drawn that indicate the markets are big now — at least big for materials in this stage of development — and will be making dramatic strides in the near future.

Tantalum is the key to the current round of expansion. Over the past few years it has had two main large volume markets, tantalum capacitors and chemical process equipment. Except for a relatively small amount used in surgical equipment, as "getters" in electronic tubes, and other minor markets, the tantalum market has traditionally been divided roughly in half between the two. But gains in the field of miniaturization of electronic components have boosted that market to an estimated 80 percent of all tantalum sales now.

Capacity

Although the people who know the production figures aren't talking, production of tantalum is now probably on the order of 225,000 pounds annually; much less for columbium. (Production of columbium is doubly hard to compute because the tantalum/columbium ratio depends on the ore used. High tantalum ore, tantalite, is most desirable but more expensive and rather scarce; low tantalum ore, columbite, is cheaper but yields additional quantities of columbium, quantities of which are already gathering dust in some warehouses. Perhaps a reasonable assumption would be that columbium production runs on the order of 25 to 50 percent of tantalum output.) Good guessers break the capacity down like this: Fansteel, the leader, is probably making between 100,000 and 150,000 annual pounds of both metals; Electromet seems to be runner-up with production somewhere between 25,000 and 50,000 pounds. Wah Chang and Kawecki Chemical



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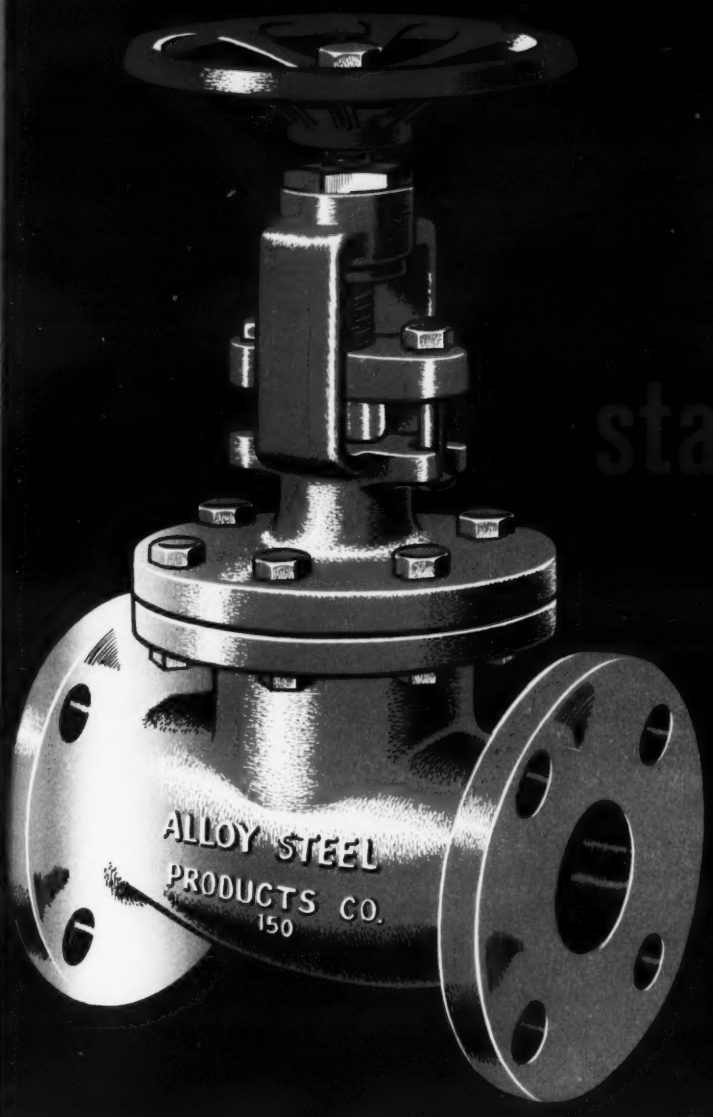
For more information on product at right, specify 4955 . . . see information request blank opposite last page.



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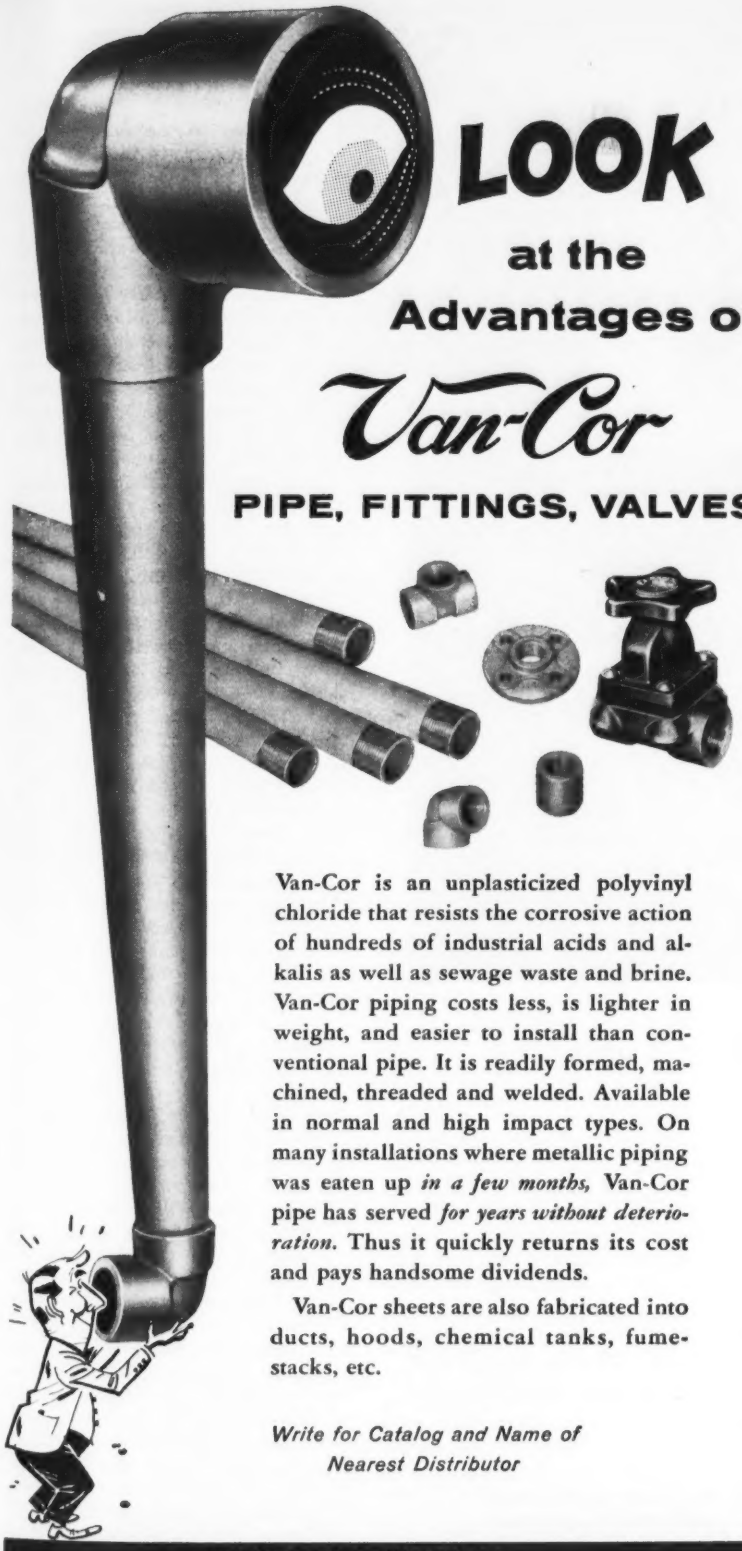

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probably vie for third place position with around 25,000 pounds each. Kennametal and Molybdenum Corporation are both producing quantities of the metals, although their production is probably under 25,000 pounds each.

Market projections for tantalum are impressive — and don't depend on government aircraft use as did titanium which did a spectacular nosedive when the aircraft program was stretched out. Tantalum demand may run to 250,000 pounds this year, perhaps 300,000 pounds in 1959, and 500,000 pounds in 1960. Sales in 1961 are expected to be somewhere between 550,000 and 600,000 pounds.

Fulfillment of these hopes, of course, depends on the expected electronics developments and on increasing use in process equipment. The electronics market is the one closer to being a sure thing. Use of complicated electronics equipment is sure to continue its growth and there's little reason to doubt that the use of tantalum capacitors will grow accordingly. Just one of the current missiles under development uses something like 15,000 per copy.

Its growth in process equipment is another story. At least two factors will keep the salesmen hustling — cost and buyer education. Titanium people have had trouble enough in these scores, and fabricated titanium can be had for between 10 and $15 per pound while tantalum brings between 50 and $80 per pound, depending on grade and configuration. But the sales problems on the two materials are about the same; it can be shown in case after case that use of either of the more expensive materials where there are rigorous service requirements — corrosion, erosion, and such — can pay off in the long run both in terms of service life per dollar as well as great maintenance and downtime savings. Everyone in the field is convinced that it's only a matter of time, but it's a tough day to day problem and they wish that the time would pass quickly.

To next page

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made from
TEFLON*
does this important job

PF flexible tubing of Teflon* is being used to connect deionized water to a lead pot in the application shown here. This tubing material was chosen for 4 important reasons:

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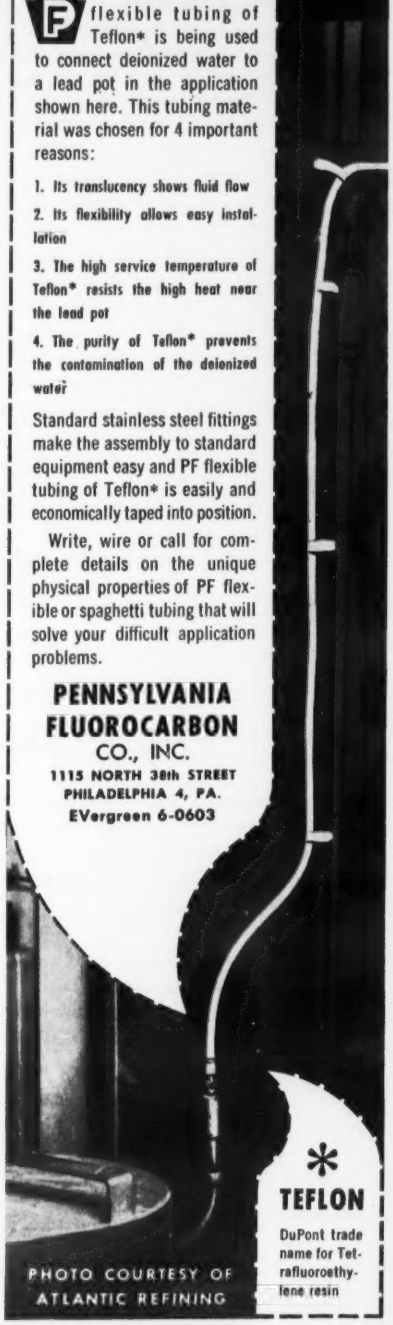

PHOTO COURTESY OF ATLANTIC REFINING

* TEFLON
DuPont trade name for Tetrafluoroethylene resin

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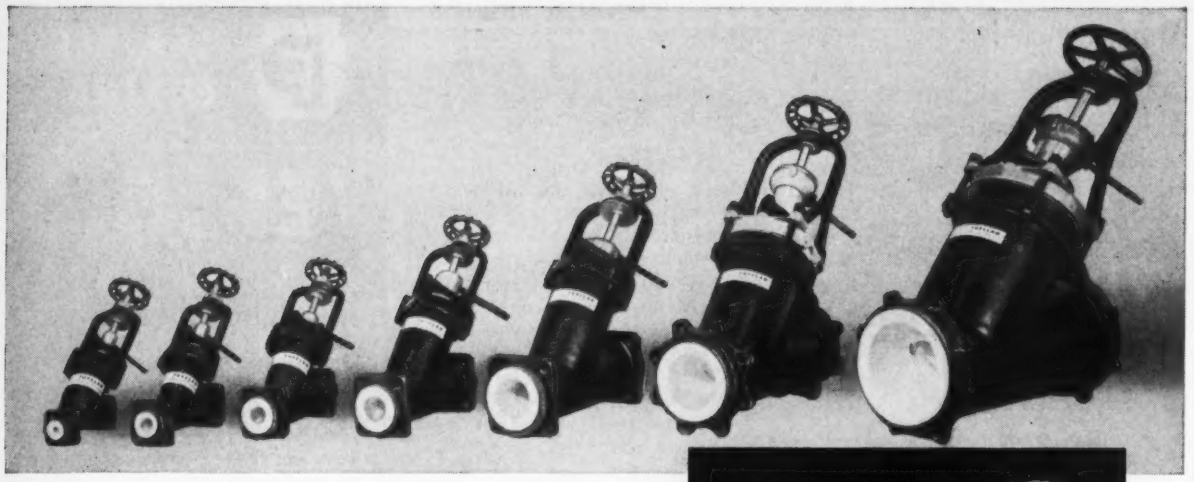

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Lapp CHEMICAL PORCELAIN

WRITE for description and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 2100 Chestnut St., LeRoy, N. Y.

Check 4959 opposite last page

CHEMICAL BUSINESS

From preceding page

USI, although a relative newcomer to the field of reactive metals, is in a unique position and may very well be the factor to contend with in the not so distant future. With both its titanium and zirconium units on stream about now (actually the plants now belong to Mallory-Sharon Metals; outgrowth of the merger between USI's parent, National Distillers and Mallory-Sharon Steel), the company is showing considerable interest in the whole field.

Plans now call for producing such metals as tantalum, columbium, molybdenum, tungsten, and chromium, as well as titanium, zirconium, and hafnium. Offering the whole range of materials holds an obvious advantage: "When we recommend one material over the other to a customer, he'll feel sure we're giving him the straight story, because we sell 'em all." Although USI itself has done all of the work so far on tantalum, it's a sure bet that it will be transfered to the Mallory-Sharon group along with titanium when it's ready for the market. If current plans work out, the company will be producing about 2000 pounds per month of both metals (tantalum and columbium) very soon, putting them in the major leagues right off the bat.

The second USI/Mallory-Sharon advantage, according to their spokesmen, is the sodium reduction process which, they feel, will give them a marked cost break in both titanium and tantalum. (Electromet uses a similar process and presumably has the same break.)

Yet as this issue went to press, a curious situation had developed in titanium sponge prices. TMCA, traditional leader in sponge price reduction, and M-S, who claims a cheaper process, had a march stolen on them by Du Pont who announced a 20 cent price cut to $2.05. TMCA, who does about half of the current titanium business, immediately met the price, and the rest of the producers, while still vacillating, were a sure bet to come along.

High-energy Fuel Pace Quickens

WILLIAM R. WHITE
Market Analyst
Hornblower & Weeks

No more vital task confronts our research physicists than the discovery and development of more powerful fuels than ever before known. Success in the assignment could assure preservation of world peace into the indefinite future. Perfection of "zip" fuels as rocket propellants is essential to achieve leadership in the nuclear arms race.

Among the better known corporations which have concentrated on the new fuels or engines are Aerojet-General, in which General Tire & Rubber holds on 87.6 percent interest; Olin Mathieson, a highly diversified producer of pharmaceutical and industrial chemicals, as well as many other items; Stauffer Chemical, a leading producer of heavy basic chemicals, which has pioneered in development of borane propellants; and Thiokol Chemical, one of the earliest manufacturers of rockets and exotic fuels.

Endeavoring to accelerate military programs, several companies have worked out mergers or cooperative agreements with others in the hope of obtaining answers to problems more rapidly than otherwise would have been the case. As an example, concerns with records of success in developing liquid fuels have combined with others whose progress may have been outstanding in solid fuels or in rockets.

Illustrative of the trend toward cooperation, it may be noted that Thiokol arranged a working agreement several months ago with Callery Chemical, jointly owned by Mine Safety Appliance Company and Gulf Oil, in an effort to develop a more powerful solid fuel from boron for use in improved Thiokol rockets. In like manner, Stauffer Chemical and Aerojet-General organized a jointly owned subsidiary to explore possibilities of boron-base fuels. Thiokol appeared to believe liquids held out promise of greater propellant powers than solid chemicals.

Olin Mathieson evidenced an interest in exploring the potentialities of high-energy fuels about five years ago when the company acquired a half interest in Reaction Motors. The latter recently was merged into Thiokol Chemical. As a result of research in boron-base materials, Olin Mathieson introduced a high-energy liquid for rocket propulsion last year. The company announced plans for construction of two borane plants which are expected to be in operation next year.

In addition to the companies already mentioned, two others have demonstrated a willingness to undertake tests. North American Aviation and Phillips Petroleum have joined in organizing a research activity known as Astrodyne Corporation to develop a new type of rocket engine instead of limiting its program to solid fuel.

In the case of most companies engaged in fuel research, sales and earnings potentials loom as relatively unimportant for the near-term, at least. Thiokol has demonstrated impressive gains in sales and earnings, however, boosting volume last year to about $30.9 million from $21 million in 1956. Net profit rose to $1.41 a share from 95 cents a share a year earlier, adjusted for the two-for-one stock split last January. Managment has indicated a conviction that the pattern of recent years can be continued this year. This would mean a projection of about $45 million in sales and about $2 a share in net profit.

(For further information on high-energy fuel producers, write Hornblower & Weeks, 40 Wall Street, New York 5, New York.)

Check 4960 opposite last page.

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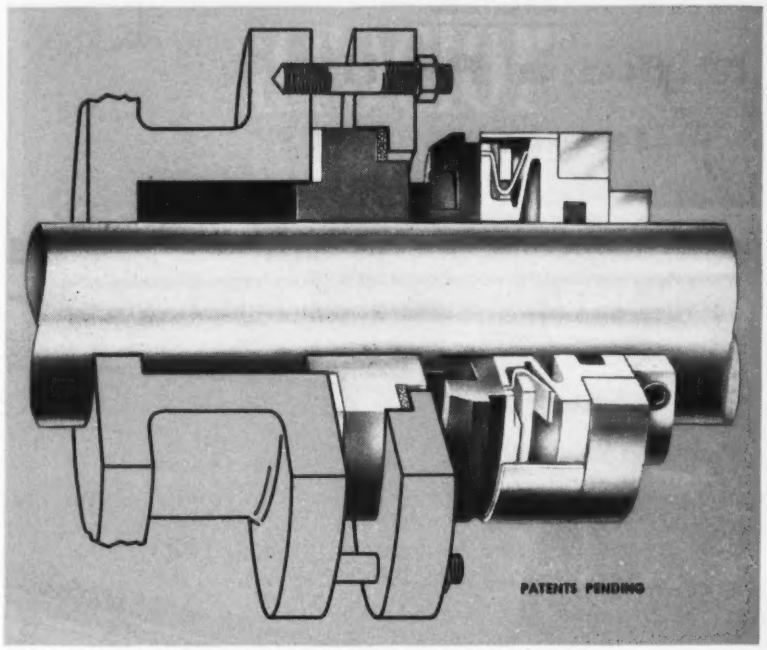
"Chemical" SEAL
(PRESSURE BALANCED TEFLON BELLOWS DESIGN)



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BELMONT

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Bakelite Joins High-density Battle

From page 43

market, they add up to something pretty close to Carbide's high-density capacity — 55 million pounds.)

End of a Chapter

Carbide's entry into the market marks the end of this chapter of the polyethylene story. The question of additional capacity — even Du Pont's — will be largely academic now. But the authors already have a good start on the next chapters — polypropylene and the higher olefins, and a number of copolymers. Hercules has already stolen the march on polypropylene, although it's a sure bet that they'll be having pretty strong competition pretty shortly — and Carbide itself may well be one of the first to compete.

And Phillips, too, isn't to be discounted. It's almost a certainty that the Phillips people are working on a polypropylene process, but they have another angle too. Although little is known about what they're doing exactly, the company has farmed a number of olefin copolymer research projects out among its licensed producers.

Montecatini, too, is figuring more and more heavily in the olefins picture in the US. Some of the Milan firm's top brass are due in the US about now — and although they won't say so directly, chances are that they are planning to make a decision one way or the other about putting up their own plant on their West Virginia property. But they'll also be pushing whatever licensing deals they can — depending, to a large extent, on the already chaotic olefins patent situation.

It's almost impossible for an observer to get a really accurate picture of the olefin situation. Whoever is approached on the subject views the future as being rosy for whatever business he happens to be in at the moment, whether conventional polyethylene, high-density polyethylene, or polypropylene — or cellophane, nylon, or vinyls for that matter. Yet, however the thing turns out, it's a sure thing that "Check" Turner's resins salesmen will be the factor that the whole industry has to contend with.

Moving Into Foreign Operation

From page 31

economically on a small scale, even at the outset.

If you have been selling in the country previously, you should have a fairly good idea of the existing market and of its potential. But have sales reflected the real market, or have they been limited by exchange controls or differentials, abnormal inventory problems, or necessity for substitution? Allowances must be made for these things.

How will you sell? If sales of imported products have been made through agents, will you continue to sell locally manufactured products through these agents, or will you establish your own selling organization? If the latter, what are the consequences in customer and government relationships?

Are sales methods used domestically applicable to the foreign market? Sales statistics of a sort will be available but it is quite possible they will be out of date, may not be too reliable, or may be difficult to analyze.

You must decide what your pricing policy will be, and its effect on customers, government authorities, market growth. Is there or will there be government price controls? What is the present duty on imported materials and what will be its status when local manufacture is begun? If there is existing or expected local manufacture of your product, you must determine if the market is large enough to support economical opera-

tion by more than one manufacturer.

What about raw materials? Quite probably not all will be available locally. It is important, therefore, to have assurance that essential ingredients can be imported. Approval of your project by the local government may depend upon utilizing indigenous materials or your assurance of eventual self-sufficiency. What price, process, and quality penalties will thus be entailed, and what will be their effect upon the continuity of operation?

Your labor: How will you get your labor? What are the requirements and cost of social services, labor regulations, service and pension obligations, etc? Will it be possible to recruit labor nearby or will it be necessary to provide housing or a company village? What about schools, stores, recreational facilities? What liabilities to employees are you faced with if you should later decide to discontinue operations?

You must estimate the minimum number of skilled technicians and management personnel required to start up operations. How rapidly can you train nationals and reduce the number of expatriates? What future products do you expect to manufacture?

Management: A perplexing problem is that of management. Because of the distances involved, various problems unique to a foreign operation, and the necessity for making quick decisions, it is necessary to delegate a great deal of authority. Since it is seldom possible with a small operation to justify a large experienced staff, various controls probably will be required. Furthermore, staff services which are usually taken for granted in this country may not be available in the new location. Above all, care must be taken to see that management cost, in terms of time and money, is not out of proportion to the profits expected.

How will the new plant be designed? It will probably be a much smaller plant than its counterpart in the United States. Perhaps it will be batch rather than continuous process, necessitating substantial modification of design. What changes in existing design are required in order to minimize investment, technical, maintenance, and instrumentation problems?

Design can be affected by the greater use of unskilled labor. In using local labor to the fullest, it may be necessary to modify equipment and sacrifice many devices and process improvements on which the US manufacturer prides himself.

Finance: Up to this point we have discussed largely the physical problems associated with operations. Now we enter the area of corporate, finance, and tax considerations — problems which are not easily solved in setting up a foreign operation.

Will the new operation be a branch of the parent company, an affiliate of a US company conducting an international business, a subsidiary incorporated in the new country, or a branch of a foreign trading corporation? Each has its advantages, some depending on long-range vs short-range aspects.

If you operate as a local subsidiary, which appears to be the most normal pattern for companies having substantial foreign operations, will yours be 100 percent owned or will you invite participation of local capital? Will you hold your equity direct or through another subsidiary in order to facilitate the accumulation of earnings for reinvestment elsewhere without subjecting the reinvested funds to double taxation?

The way a new foreign operation is financed will be determined in large part by forecasts of the stability of the local currency and by tax considerations. Borrowings in local currency are a protection against devaluation, but interest rates are usually high. Furthermore, the amount that can be borrowed is limited.

The International Cooperation Administration of the US Government may be prepared to guarantee a remit-

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TEMPERATURE CONTROL TO ±2°F. at the heater with instant response to changing load demands. This positive temperature control means uniform product quality without the need for elaborate secondary controls at the point of process.

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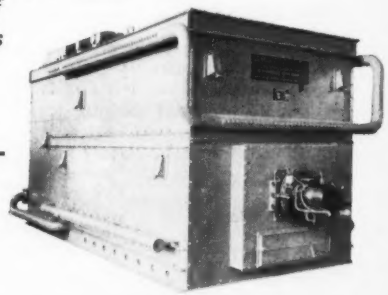

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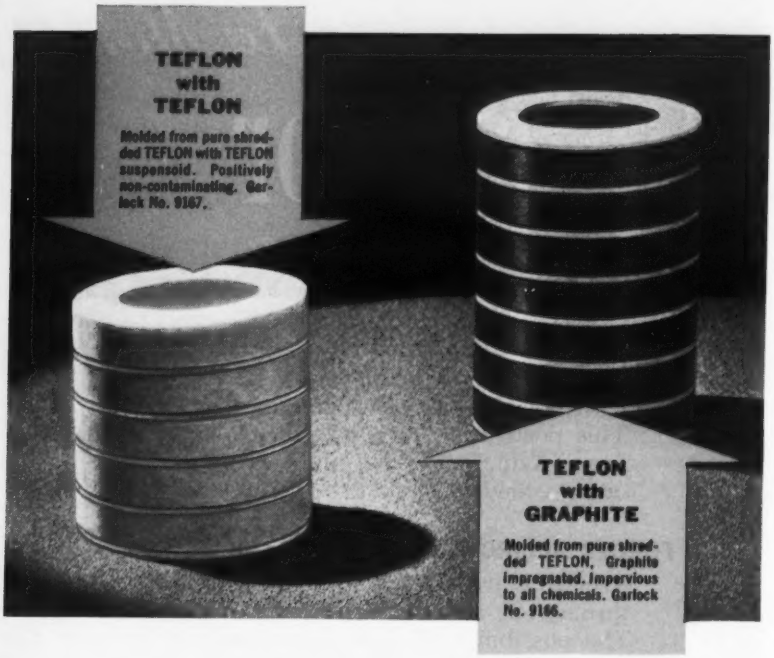
standard for corrosion service . .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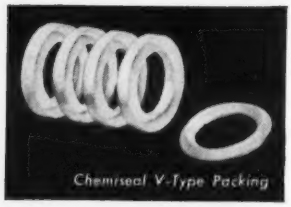

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Solid TEFLON Ring packings are available in Chemiseal V-type, diagonal, triangular, conical and Garlock Chevront ring designs—providing necessary seal at low gland pressure and reducing torque required to operate the valve.

Chemiseal TEFLON* Pump packings offer remarkably trouble-free service, and useful life many times that of other type packings.

Impervious to all chemicals, excepting only molten alkali metals and fluorine at elevated temperatures, these packings are giving highly satisfactory performance sealing against such difficult and hazardous liquids as sulphuric, chromic, nitric and hydrofluoric acids; chlorine, bromine, sulphur chloride, sulphur oxychloride, hydrogen fluoride and concentrated hydrogen peroxide.

Extremely effective for rotating and reciprocating shafts, Chemiseal TEFLON pump packings provide a low friction, 2-way seal that not only prevents axial seepage, but also seals against shaft and stuffing box as well. Supplied in sets to meet specific requirements.

For prompt service, contact one of The Garlock Packing Company's 30 sales offices and warehouses in the U.S. and Canada, or write for Bulletin AD-155.

United States Gasket Company
Camden 1, New Jersey

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United States Gasket Plastics Division of **GARLOCK**

Check 4964 opposite last page

CHEMICAL BUSINESS

Moving Into Foreign Operation

From preceding page

tance of dividends in repatriation of capital. Should application be made? Are the premiums justified, or will negotiations for such coverage delay proceeding with plans and affect start-up of the new operations?

Some foreign countries offer tax concessions for new industries. What are the conditions and will any advantage be realized in the absence of tax benefit in the United States? This may indicate different methods of financing.

Reference has been made to government approvals. The question may be asked: Why should government approval of foreign operations be any more necessary than in the United States? This is difficult to answer because the differences are in degree and not in kind. In the first place, you are a foreigner asking for hospitality and protection by the foreign government. Today, practically every country of the world has some form of government control of imports, exchange, remittance of earnings, and tax regulations. In addition to existing government controls, the possibility of future regulatory measures or expropriation must also be taken into consideration.

It is most important, therefore, to make sure that the new enterprise is welcomed by the foreign government, that it will benefit the country and its economy, and that continuing fair treatment and support can be expected.

Work simplification films

Film rental catalog includes more than 70 films describing American work simplification and industrial engineering techniques. Folder explains terms by which the 16mm films, running 10 to 15 minutes, are available for rental. "Work simplification on film" folder — Industrial Management Society, 330 South Wells St., Chicago 6, Ill.

Check 4964A opposite last pg.

PUMP PROBLEMS
write
TABER

BEFORE DECIDING ON TYPE OF PUMPS . .

SEE **TABER** **BULLETINS**

May avoid costly pump misapplication.

Vertical pump illustrated, for handling chemicals, please request Bulletin V-837. Horizontal Pump, Bulletin C-355.

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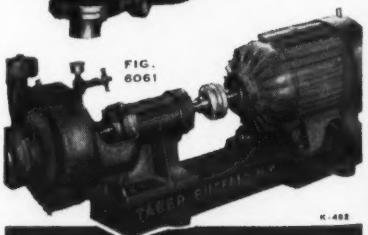

TABER

Check 4965 opposite last page

Preparing a unit load of Drymet at Cowles. Adhesive locks bags together to stop sliding in handling. They can be lifted easily with little or no tearing

Photos by CP Staff

At Cowles Chemical Co., paper bags and expendable pallets combine as basis for a 2500-lb unit load. Company and customer profit when truckload and carload shipments are built from these unit loads as . . .

Unitizing Cuts Costs by 85 to 88% in Both Loading and Unloading

THEODORE W. WETT, Assistant Editor
With **NORMAN E. WOONTON,** Vice President, Manufacturing
Cowles Chemical Co., Skaneateles Falls, N. Y.

Take-it-or-leave-it wooden pallet, combined with expendable pallet, permits unit load to be handled either way. Unit load is more easily handled within the plant

Unitized loads have cut loading and unloading costs by 85 to 88% for Cowles Chemical Co. and their customers. It costs $9.00 to load or unload a 300-bag truckload in the conventional manner, $1.25 if the load is unitized. For a 600-bag carload that has not been unitized, the cost is $45.00. Unitizing lowers this to $5.00.

Two factors have been instrumental in making unitized loading a success at Cowles. One is the cooperation of paper bag suppliers in designing the proper bag. Loads must completely fill car or truck to prevent damage from shifting during transit. Special non-skid surface on bags helps stabilize loads. Second factor was development of a sturdy, inexpensive, pressed-fiber-board, expendable pallet.

A typical product which benefits from unitized loading is Drymet, Cowles' anhydrous sodium metasilicate. A unit load consists of 25 bags, at 100 lb net weight each, arranged in an interlocking pattern on an expendable pallet. Pallet is a rectangular sheet 40 x 50″ with a 4″-wide flap running along one of the two dimensions. Pallets with flap along 40″ side are used for truckloads, along the 50″ side for carloads.

A special adhesive is used to lock bags together into a unit load. It has a high shear strength which stops bags from sliding on each other. It has low tensile strength which makes it easy for customer to lift bags off load with little or no tearing of outer sheet.

For loading and unloading, a standard lift truck can be used. Forks should be 42″ long and have chisel edges. Starting from a point 3″ from end of fork, edge should be tapered down to a minimum thickness of about 1/16″.

Palletization and unitized loading have advantages in addition to saving in loading and unloading: Quicker, easier handling from production to warehousing; neater, safer stacking, and less damage in transit.

Cowles started unitizing about two years ago. A careful study of costs disclosed the following facts: For a regular 300-bag truckload, loading or unloading

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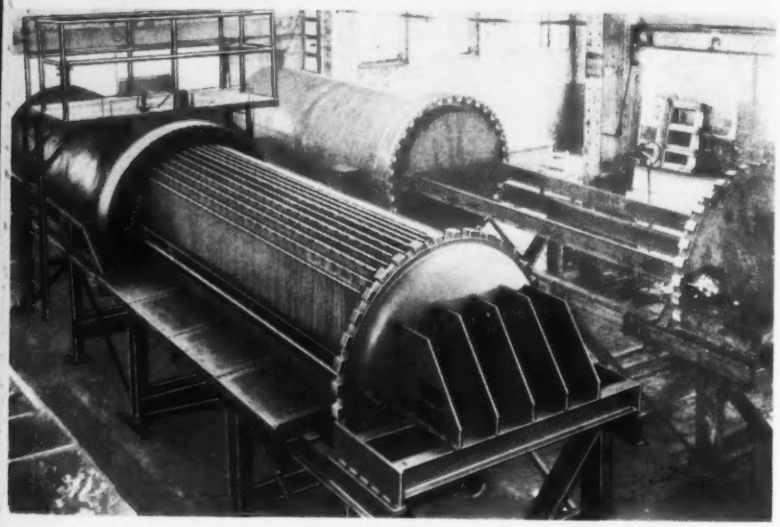

G-B Retractable Shell-Type Filter Clarifies green Sodium Aluminate Liquor

This new filter, the retractable shell, is designed for filtering under pressure. Originally developed for the aluminum industry, this unit has proved to be extremely successful for clarifying green sodium aluminate liquor. Perhaps the most unique feature is the fact that filtrate lines need never be broken, but are permanently connected to achieve high pressure filtration without leakage. The retractable shell filter is available now for all types of process problems. Pressures up to 100 psig, sizes to 3000 sq. ft. Generally constructed of steel; however, it can be built from stainless steel and other specified metals.

Write for more complete information.

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—restriction or removal of discoloration.
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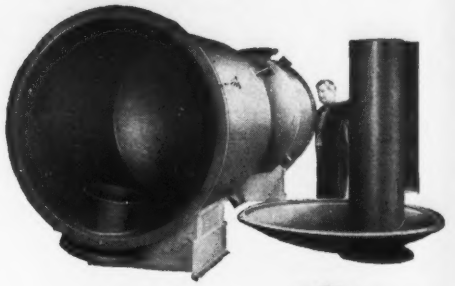

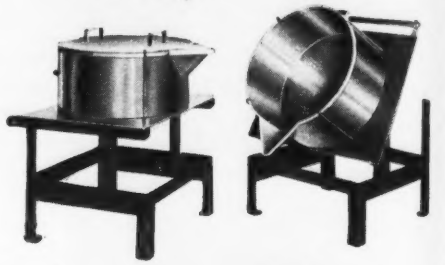

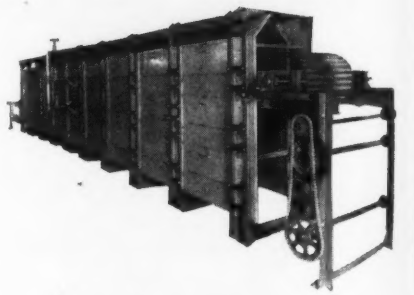

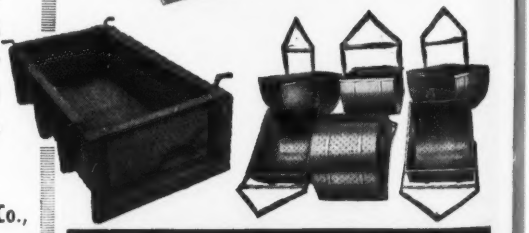

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STAINLESS STEEL FABRICATION

Check 4967 opposite last page

Unitized Loads

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labor and equipment costs were three men for one hour, at $2.00 per hour; and one lift truck, at $3.00 per hour — for a total of $9.00. After unitizing this load, one man could unload entire truck in 15 minutes — total cost $1.25. A 600-bag carload that had not been unitized could be loaded in five hours by three men with a lift truck. Using same hourly labor and equipment charges, cost was $45.00 per car. One man with a truck could do the entire job in one hour after load had been unitized, at a saving of $40.00 per carload.

Bags used for Drymet are of sewn-valve, multiwall construction. Moisture barrier is sheet-kraft laminated to polyethylene. Cowles has on hand over 25 different sizes and types of bags to handle variety of products, including raw materials for commercial and industrial laundry detergents. Because of the savings bags provide in storage space and material costs per pound of product, in addition to handling ease, most of Cowles dry products are packaged in this manner.

(Poke-Pak expendable pallet is supplied by Mead Board Sales Inc., 6124 N. Milwaukee Ave., Chicago, Ill.)

Check 4968 opposite last page.

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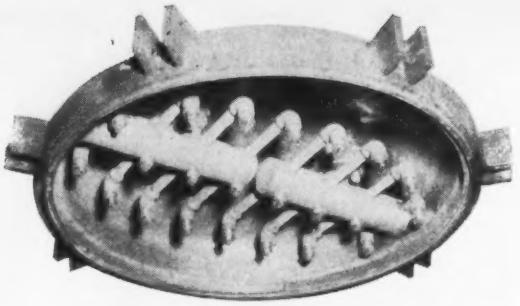
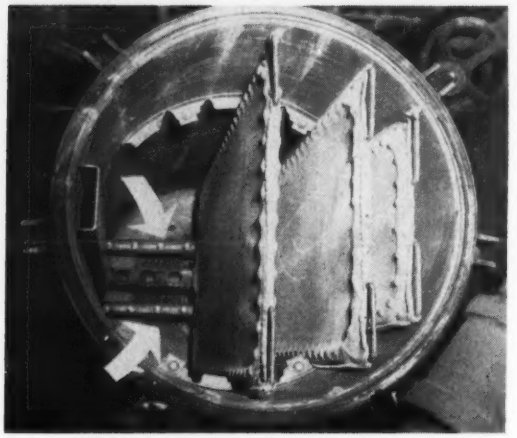


Twenty-two nozzles are mounted in filter's cover

New-type stationary sluicing device removes tough cake from filter so that toxic material need not be handled manually. Except for occasional inspection, filter never has to be opened, resulting in . . .

ULTRA-SAFE FILTRATION OF TOXIC LIQUORS

TED F. MEINHOLD, Associate Editor
with **LEO MINUCCI,** Assistant Superintendent
American Cyanamid Company, Linden, New Jersey



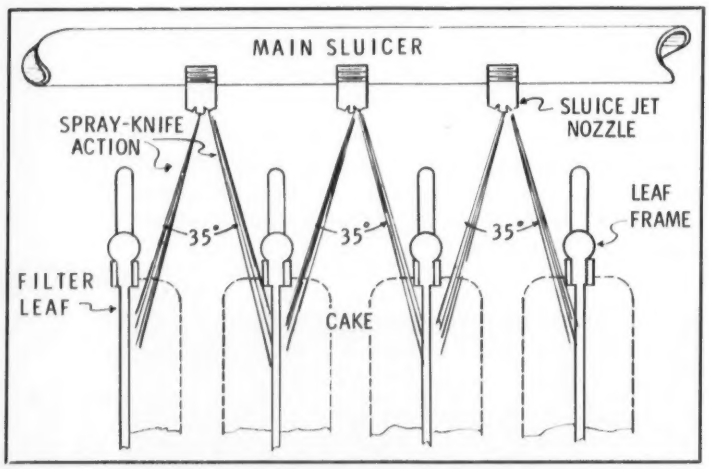
View looking down into filter. Arrows point to twin sluicing headers and nozzles

Problem: Difficulties experienced in the processing of a highly toxic organic intermediate at American Cyanamid Company, Linden, New Jersey, were traced to solid particles dispersed throughout the material. These particles, formed in a preceding reaction, interfered with the washing operation, caused loss of material in the interface during separation, and impaired subsequent reactions.

For the removal of these solid particles several types of enclosed filters had been tried, but were found unsatisfactory. The cake removal represented an extremely difficult problem because of the adverse hygienic effects from vapors.

Solution: It was recognized that a special type of filter with suitable capacity would be required for this operation. The filtering elements would have to be completely enclosed and the cake sluiced entirely without opening the filter, except for occasional inspections. All of the above pointed to a pressure-leaf-type filter with sluicing device.

Several pressure-leaf filters were tried. Although the test units indicated desired filtration rates and product clarity, the cake removal problem was not completely solved. Some of the cake clung to the filter leaves or would not break up, in spite of pressure increases in the sluicing water supply and heavier filteraid precoat. The filters had to be opened very frequently for manual cleaning. During the cleanings it was observed that once the hard outer crust of cake was pierced at the top of the leaves where the leaf frame overlaps the screen, the cake separated from the screen along the precoat layer and broke easily in a stream of water.



Series of special flat-spray nozzles, developing knife-like sprays at 35° angle, is heart of sluicing system. Located at top and bottom of filter, sprays produce a continuous cutting wedge along a horizontal line at the junction of surface screen and leaf framing

The conventional sluicing nozzles which were installed in the test filters, develop a diffused spray designed to cover the whole screen area of the leaves. While this type of spray action dislodges softer cakes, the experiments with manual sluicing indicated the need for a hard and concentrated spray designed to cut the cake along a horizontal line at the junction of surface screen and upper leaf framing.

After piercing the cake, the sluicing water would wedge between the cake and the screen as it flows down along the leaf surface, peeling the relatively softer precoat layer from the screens. Thus the whole screen area would be covered by the flow of sluicing water.

A pressure-leaf filter incorporating a sluicing system designed on the basis of this new concept was developed by American Plant Equipment Company in cooperation with American Cyanamid Company, and installed at the Plant. This unit maintains the stationary arrangement of filter leaves and sluicing device so that the user is not troubled with the maintenance of stuffing boxes, usually required with rotary components.

Sluicing System Design

A series of special flat-spray twin nozzles, developing two knife-like sprays set at an angle of 35° is the heart of this sluicing system. The sluicing nozzles

are brought into proximity of the cake by locating them at a distance of about 4 inches from upper edge of cake. To produce a continuous cutting wedge, several nozzles were installed in line, spaced to insure overlapping of the sluicing action.

The outer nozzles were mounted in elbows connected by ⅜-inch pipe nipples to the central sluicing header consisting of a 2-inch pipe on which the center nozzles were mounted.

Accumulation of spent cake at the root of the leaves and above the filtrate manifold

Pressure-leaf filter handles toxic product without difficulty. Unit never has to be opened for cleaning

was prevented by installing two 1¼-inch pipe bottom sluicing headers below the leaves. The headers carry same twin flat-spray sluicing nozzles, but are mounted to spray upwards. Headers are removable, so that filter tank cover need not be opened for inspection of bottom nozzles.

At a pressure of 60 psi, the 22 spray nozzles installed above the leaves would require a sluicing water rate of about 100 gpm. However, at the filter location process water was not available at this rate, and it was decided to carry out the sluicing operation in three steps. For this purpose the upper sluicing device was split into two

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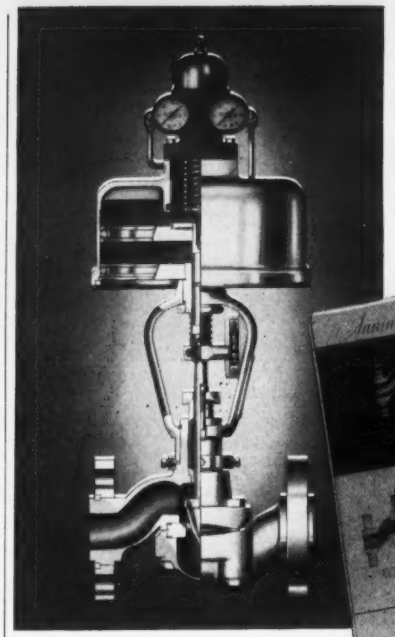
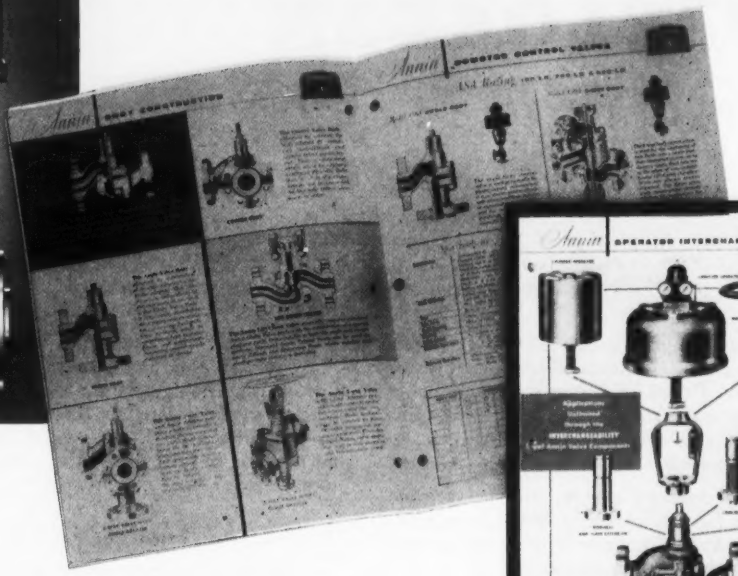
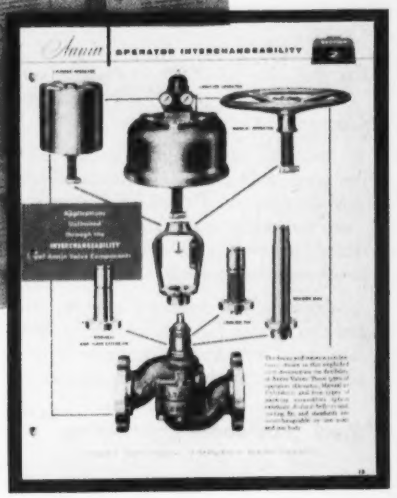


HOW ANNIN DOES IT.





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No other process control valve offers the advantages in economy and adaptability as that provided by the Annin valve. The split body eliminates pockets and shoulders that create undesirable turbulence and accumulated solids, reduces erosion and allows consistent flow behavior with a wide range of fluids under all conditions.

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Applications unlimited are provided by interchangeability of Annin component features. Three types of operators, and five types of packing assemblies (plain extension, bellows seal, doolseal, cooling fin and standard) are interchangeable on one yoke and one body.

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THE ANNIN COMPANY
Division of The Annin Corporation
1040 S. Vail Ave., Montebello, California

ANNIN VALVES

Check 4970 opposite last page

Report on the All-New
Model H-25
PAYLOADER®

by G. A. Gilbertson,
President of The Frank G. Hough Co.

Recently I had the pleasure of personally delivering the 10,000th production model HA "PAYLOADER" to our Distributor in the metropolitan Chicago area.

Because our company pioneered the first unit-designed, rubber-tired front-end loader and because this quantity of 10,000 of a single model is more than all other manufacturers combined have produced, we were justifiably proud of our accomplishment and the acceptance of our product by industry.

Inasmuch as we anticipate a continued demand for this model HA, we plan to continue its production, even though we are now introducing a completely new machine, the model H-25.

More "Payloader" Pioneering

This new H-25 "PAYLOADER" is in a class by itself as far as capacity, productive ability and features are concerned — a quality machine in *every* sense of the word. It will handle more tonnage per hour and at less cost per ton than any front-end loader near its size.

What is so different about the new H-25?

More Capacity and Maneuverability

In terms of capacity alone, it is outstanding . . . the only machine with a *carry capacity* of 2,500 lbs., at average operating speeds of 4 m.p.h. Thus, for handling materials weighing 125 lbs. per cu. ft., it can have a bucket with 20 cu. ft. S.A.E. capacity rating. Larger and smaller buckets are available for lighter and heavier materials.

With a bigger and heavier unit having more capacity, you would logically expect it would need more room to operate. On the contrary, it actually has a turning radius (measured to the outside rear hub) which is LESS than ANY other rubber-tired tractor-shovel.

The H-25 Has Extra "built-in" Strength

Some operators will always push equipment to extremes, regardless of its recommended capacity. This abuse will inevitably result in extra maintenance and even failure. That is why we have engineered extra strength and stamina throughout the H-25 . . . for your protection.

What About Individual Features?

There are dozens of them! The new power-shift transmission is a two-speed, full-reversing type with new matched torque converter that give the ultimate in speed and ease of operation. Power-steering adds further to handling ease.

This new "PAYLOADER" is equipped with sealed, self-adjusting brakes and is the only unit of this class offering this important feature.

It has a maximum dumping height that is 6½ inches higher than the average of other loaders now being offered in this general capacity range. The 44 HP gasoline engine has overhead valves for better performance and wet sleeves for easier maintenance. LPG (liquified petroleum gas) and diesel power are available.

Dig-ability?

When it comes to digging power, the H-25 gives you 4,500 lbs. of breakout force and, like other "PAYLOADER" front-end loaders, provides a bucket tip-back of 40 degrees, ***at ground level!*** As the bucket raises, a further tip-back to 65 degrees helps retain maximum loads.

Protective Features

If you are concerned with dust and dirt like most chemical, fertilizer and foundry operators are, you will appreciate the extra protective features engineered into the H-25. For example, the engine is afforded maximum protection with triple air cleaners — a precleaner and dual oil-bath air cleaners. The hydraulic system is fully filtered and is the closed, pressure-control type.

The sealing of the majority of all pivot points reduces maintenance. Transmission and torque converter oil is cooled by the engine radiator cooling system and is fully filtered.

Other Features

This new H-25 is equipped with high-traction differential which automatically transfers more torque to the drive wheel with the best footing when slippage is encountered.

The fuel tank of this new "PAYLOADER" has sufficient capacity for eight full hours of operation and eliminates the need for refueling during any shift.

There are many, many more features which we think you will be interested in. The many interchangeable attachments now available for the model HA "PAYLOADER" can also be used on the new H-25. Contact your "PAYLOADER" Distributor for full details. Ask him about Hough purchase and lease plans, too. The Frank G. Hough Co., 744 Sunnyside Ave., Libertyville, Ill.

5-A-2

You can see the model H-25 in Cleveland at the FOUNDRY SHOW, May 19-23 and NATIONAL MATERIALS HANDLING SHOW, June 9-12.

Modern Materials Handling Equipment
THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Check 4971 opposite last page

'No product is so good that it can't be improved' is the philosophy of this leading protective coating manufacturer who took advantage of a chemical advancement to . . .

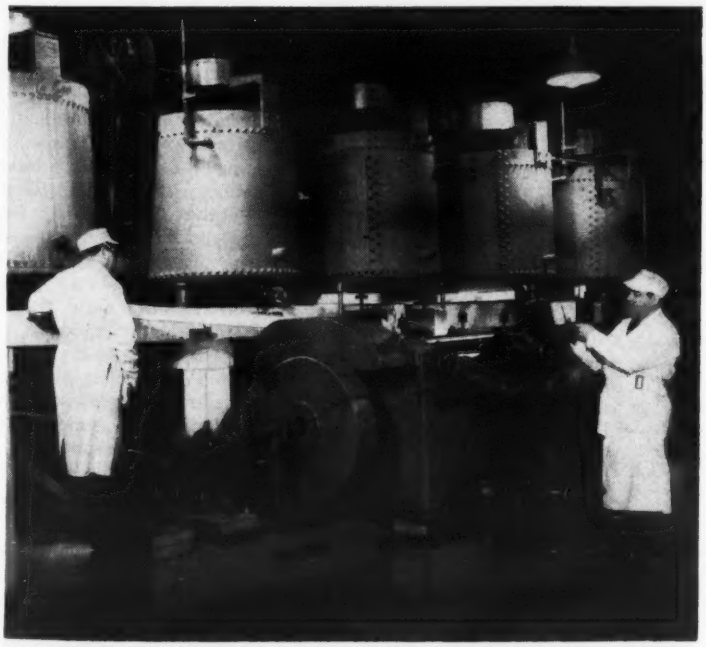
Achieve A Better Product With Vinyl Resins

THEODORE W. WETT, Assistant Editor
With **MR. D. M. LAMB,** Technical Director
Better Finishes & Coatings, Inc., Newark, N.J.

Problem: Although chemical resistance of vinyl coatings produced by Better Finishes and Coatings ranked with the best on the market, management believed that it could be improved. To produce adhesion necessary for a permanent finish, vinyl was modified with an alkyd. This gave desired durability but reduced chemical resistance of basic vinyl resin.

Vinyl coatings are used as "Liquid Envelope" for steel tanks, storage bins, and brick or steel buildings or structures. Good adhesion was particularly important in these permanent applications where a 15 to 40 mil dry film buildup was needed. Formulations were also used as strippable protective coatings for industrial and general packaging during production and for prolonged storage or "mothballing."

Company pioneered in field of strip coatings and industrial packaging coatings. Among these are thick films of approximately 30 to 40 mils used to form a weathertight plastic coating around any object that needs protection against corrosion or physical abrasion during shipping, handling, or storage — indoors or outdoors. Thinner films, 1/10 to 5 mils, are used to coat surfaces of metals, glass, porcelain, lacquer, and baked enamel during fabrication operations to prevent scratches, abrasion, die or tool marks, or other damage. This film can then be stripped from the surface easily.



Compounding protective permanent and strip coatings at Better Finishes & Coatings. Basic vinyl resin gives products increased chemical resistance

Because of wide variety of service conditions to be met, basic resin used had to have adaptable characteristics. In some cases, such as permanent protection of storage tanks, high chemical resistance and adhesion were of prime importance. Thin strip films have to be tough and elastic.

Solution: In 1955, as part of a continuing program of product improvement, Better Finishes evaluated a newly developed series of vinyl resins. As a result, these resins were selected to replace product then in use for high-adhesion, permanent finishes having maximum chemical resistance obtainable with vinyl coatings.

Resins are vinyl chloride copolymers with properties of adhesion varying to meet required characteristics of end product. All are compatible with most common vinyl plasticizers, and numerous solvent systems are possible.

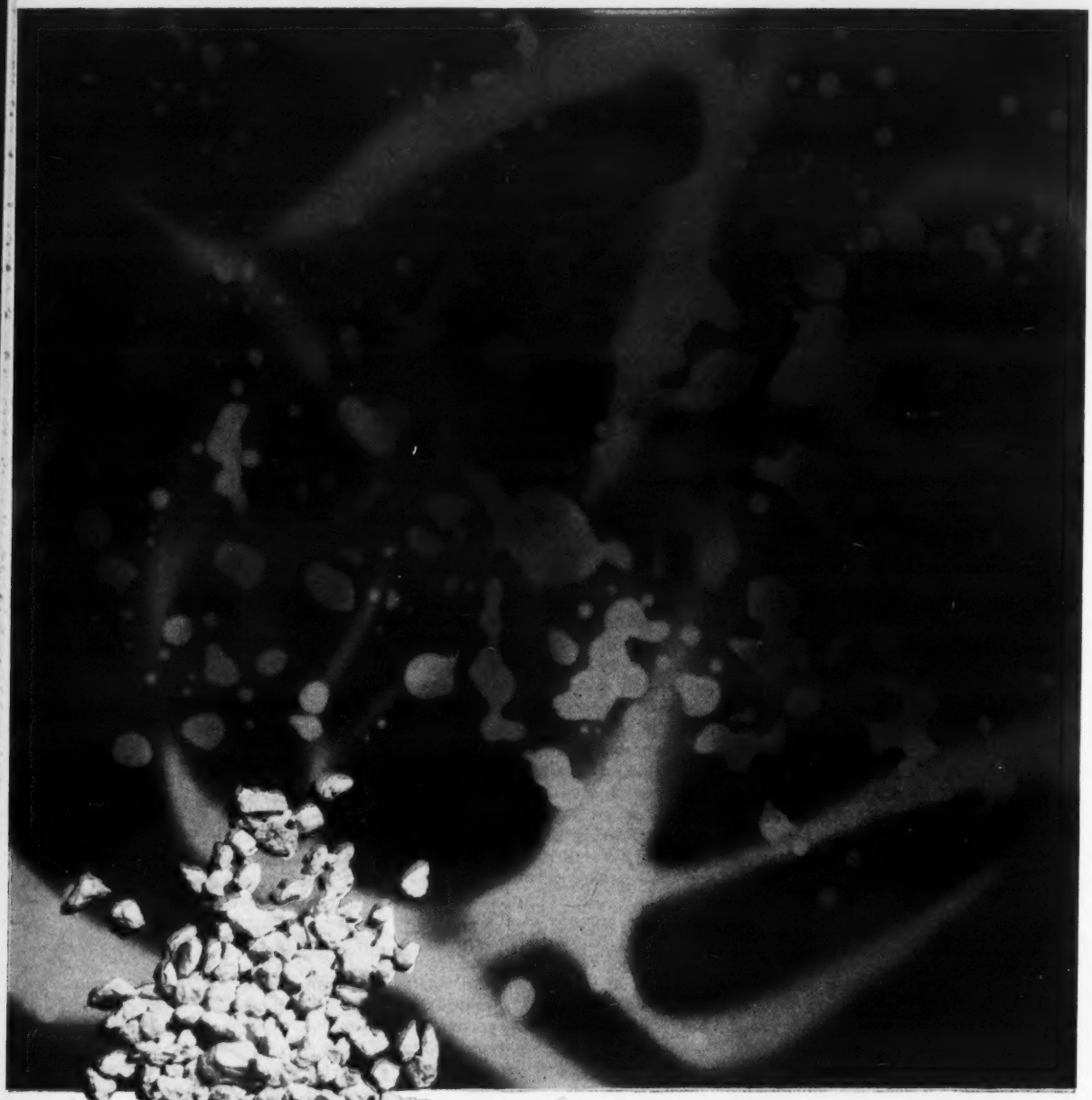
PHYSICAL PROPERTIES OF A TYPICAL RESIN

Form	Granular powder
Specific gravity	1.31
Bulk density (dry), gm/cc	0.8
Bulk density (solution), gal/lb	0.091
Relative viscosity (1% in cyclohexanone)	1.35

Basic resins are combined with plasticizers, polymeric or phthalate type depending on application, and stabilizers such as lead organo-tin salts. Solvent is a selected ketone with an aromatic hydrocarbon used for a diluent where necessary. Standard pigments are employed.

Results: New resin's properties made it possible to achieve desired adhesion without modification formerly necessary. Resulting product has protective qualities equal to that provided by catalyzed systems. Maximum solids content obtainable has been increased from 35 to about 65%. Where heavy film thicknesses are desired, solutions in excess of 50% solids are possible. Brushability approaches that of oleoresinous type paints.

Maintenance coating, 15 to 40 mils, has excellent resistance to gasoline, many solvents including alcohols and aliphatic hydro-



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Check 4972 opposite last page

carbons, oil, acids, alkalis, and salt spray.

In thin films they are tough. So much so that a 0.002″-film on #4 polished stainless sheet does not rupture during an 8″ draw.

(Exon vinyl resins are a product of Firestone Plastics Co., Div. of Firestone Tire & Rubber Company, Pottstown, Pennsylvania.)

Check 4973 opposite last page.

(For more information on protective coatings, contact Better Finishes & Coatings, Incorporated, 268 Doremus Avenue, Newark 5, New Jersey.)

Check 4974 opposite last page.

Ultra-safe Filtration

From page 61

branches, each with its own supply nozzle welded into the filter cover to permit sluicing of one-half of the leaves in the first step and of the other half in the second step, thereby reducing the required supply rate to 50 gpm. The third step of the sluicing operation uses the two bottom headers.

The sluicing equipment was installed in a Series 3000 Pronto Heavy Duty Pressure-Leaf Filter with 3-inch leaf spacing. In view of corrosive conditions, unit was constructed of 316 Stainless Steel on all wetted surfaces. Filter leaves are of bolted-design to simplify eventual replacement of the Type 316 surface screens with screens woven from Hastelloy wire.

Results: Filter removes troublesome solid particles from the intermediate product without difficulty. Repeated inspection of filter after sluicing operation reveals that cake is removed completely and consistently, making opening of filter with its adverse hygienic effects unnecessary.

(Filter and sluicing system was produced by American Plant Equipment Company, Dept. CP, 701 Spring Street, Elizabeth 4, New Jersey.)

Check 4975 opposite last page.

'Wall-stretching' beats storage problem

Sliding bins increase usable storage area

Problem: During construction of Schering Corp. manufacturing plant at Union, New Jersey, it became evident that storage area allotted for one production process was inadequate. Yet space for additional storage was at a premium.

Solution: Possible production bottleneck was eliminated through use of a mobile storage system. This "wall-stretching" was accomplished by placing two additional rows of mobile shelving units

Storage attendants find units easy to roll

directly in front of original row of seven stationary units.

Shelving units in front rows were individually mounted on special four-wheel mobile bases or dollies placed on ½"-high floor-mounted steel tracks. Each mobile row has one unit less than rear row. Open space provides room for any mobile unit to roll aside, permitting access to rear unit.

Results: Success of initial installation has led to a large mobile installation in other areas of the building. In each case, substantial gains in storage capacity have resulted.

(Mobile storage units are product of Dolin Metal Products, Incorporated, 315 Lexington Avenue, Brooklyn 16, New York.)

Check 4976 opposite last page.

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to solve many problems

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KYLAN is produced mainly from shrimp, lobster, etc. shells. Many unusual properties of chitin have been known for centuries but, until the KYLAN recovery process was perfected, the price was prohibjtive. Today large quantities of rigidly controlled quality KYLAN are produced daily at a price which makes it commercially feasible for dozens of uses.

Here is what we know about KYLAN

IN COSMETICS: KYLAN has approximately the same pH as human tissues. Acts as an acid stable protective colloid.

IN PHARMACEUTICALS: KYLAN's acid absorptive properties recommend it for many pharmaceutical uses.

IN ADHESIVES: KYLAN improves tensile strength and water resistance in many types of adhesives.

IN TEXTILES: KYLAN improves water repellency, fiber strength, and dye fixation. Improves warp and finishing sizes.

IN PAPER: KYLAN increases wet strength and improves printing properties of paper.

IN CHEMICAL RESEARCH: The unique structure of this chitin recommends its use as a building block in many varied reactions.

KYLAN will solve many problems. We will be glad to send you brochure and samples.
*Trade name for chitosan or deacetylated chitin.

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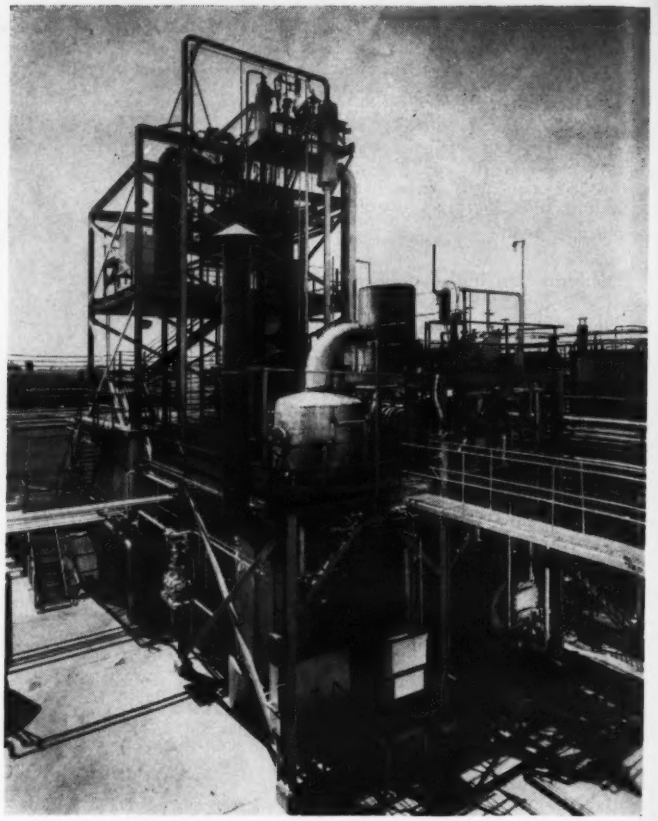


Installed at HumKo's Chemical Department, semi-continuous still with efficient radiant-fired furnace is first of its kind in the fatty acid field. Almost like 'squeezing out the last drop,' unit economically . . .

recovers high-grade fatty acid from still 'bottoms'

TED F. MEINHOLD, Associate Editor
with **LOUIS A. SWEET,** Assistant Plant Superintendent
HumKo Chemical Department, Memphis, Tennessee

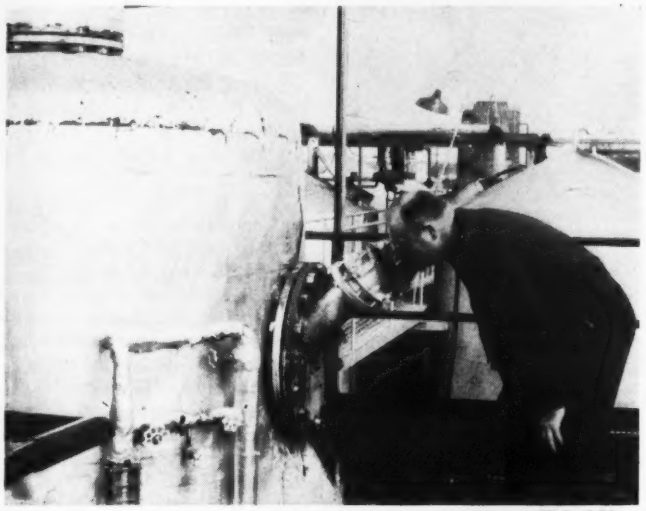
Problem: An efficient unit for refining "bottoms" and off-grade material from their fatty acid stills and other sources was sought by HumKo Chemical Department, Memphis, Tennessee, when they were planning the expansion of their production facilities.

Conventional equipment used for this purpose usually consists of a simple direct-fired, cast iron, pot still with a brick-lined furnace. Although such units operate satisfactorily, they have several disadvantages. The big-best one is that they generally burn out in two to three years. Other disadvantages include long heating-up and cooling-down periods, poor temperature control, excessive fuel consumption, and high maintenance.

HumKo's Chemical Depart-

Radiant-fired furnace (foreground) has lower portion of heating vessel suspended inside furnace. A continuous fatty acid still can be seen in background

The still can be heated-up or cooled-down in about one-half hour. Assistant plant superintendent, L. A. Sweet, is shown peering into kettle's sight glass



CP Staff Photo

ment, a division of National Dairy Products Corporation, is one of the nation's largest producers of high-purity fatty acids. It produces a complete line of fatty acids, which it markets under the names of Hystrene, Industrene, and Neustrene.

Solution: Engineers decided on a semi-continuous, stainless steel unit, using a radiant-fired furnace as a source of heat. Installed in January 1957, the equipment is the first of its kind used in the fatty acid field.

The heating vessel is made of 316 stainless steel. It has excellent corrosion resistance and heat transfer characteristics. Capacity of the still pot is about 2000 gallons. The vessel is mounted on top of the furnace — the lower portion actually being suspended inside the furnace. Radiant heat absorption is effective over the entire area of the surface within the furnace.

The furnace is also made of 316 stainless steel. Two burners, designed to use either gas or oil, are mounted tangentially near the base of the unit to produce a vortex of flame. Location of burners and the arrangement of the furnace interior surfaces are designed to produce a very diffused, evenly applied heat radiation to the exposed surfaces of the heating vessel.

About 75% of the total heat applied to the batch is by radiation from the furnace walls. Heat flows rapidly into the still without the development of local hot spots. The furnace unit is covered with a 4" layer of glass-fiber insulation. Aluminum jacketing is used to protect the distillation equipment from the outdoor atmosphere. It also enhances the unit's appearance.

Results: The new unit refines still bottoms and other off-grade material into high-grade fatty acids, smoothly and efficiently. At the same time, the remaining pitch is stripped of all distillable fatty acids. The pitch is suitable as an as-

selective reducing agents, polymerization catalysts, anti-oxidants, stabilizing agents—

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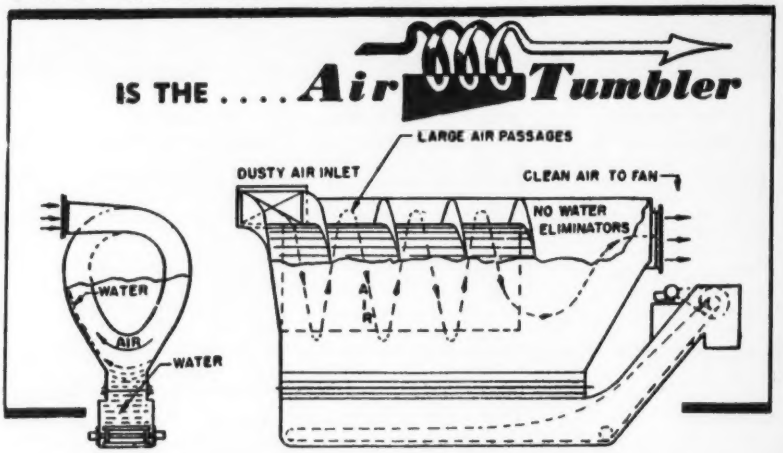

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Normal condensate loads—Series 120; pressures 10 to 600 psi, temperatures to 750° F. Six sizes, ½" to 2".

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Medium pressures and temperatures—½" No. 20-A; pressures 10 to 400 psi, temperatures to 450° F.

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Check 4981 opposite last page

phalt additive or other allied uses.

Operating around-the-clock seven days per week, the unit processes the still's rated capacity without effort or taxing the furnace facilities.

Operation of still is semi-continuous; length of batch being dependent upon amount of residue left in the pot after overhead distillation ceases.

Unit operates between 400 and 450°F. Temperature control inside still is excellent; being held to within plus or minus 2°F. A better than 10-mm (Hg) vacuum absolute is maintained in the unit by means of a 3-stage steam jet system.

The still can be heated-up or cooled-down in approximately one-half hour — compared to two to three hours required by conventional units. It takes approximately 10 minutes to dump the pitch from the pot. This entire unit is completely operated by one trained operator.

Maximum skin temperature of furnace is 1160°F. It functions on gas except for the stand-by option of No. 3 fuel oil. The unit under normal operation uses from 12,000 to 18,000 cfh of 1000 Btu gas. Because of the small amount of heat retained by the furnace and the effectiveness of the insulation, heat losses are kept to a bare minimum.

With the exception of a few minor difficulties of which one was the determining of the proper type of thermocouples for detecting or controlling the skin temperature of the pot, the unit has operated very satisfactorily since its original installation.

(Fatty acid still with radiant-fired furnace was designed and installed by Chemical Plants Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh, Pennsylvania.)

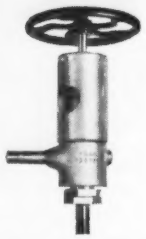
Check 4982 opposite last page

(Further information about Hystrene, Industrene, and Neustrene fatty acids products may be obtained from HumKo Chemical Department, Division of National Dairy Products Corp., 1231 Pope Street, Memphis, Tennessee.)

Check 4983 opposite last page

CESS PIPING POINTERS

30,000 psi. valve gas processing



le and check s developed for rocarbon gas ssing at a new Coast petro- ical plant show ed progress in r-high-pressure n. Angle valve rated is size 5/8 I.D. x 1-11/32 O.D. Body is SAE 4140 forged Body seal ring is Pressure-Seal and V-ring Teflon packing seals em which operates in ball-bearing sleeve. Disc is Stellite-faced; seat ring is tungsten carbide. In- ed in the large order for these e 30,000 psi. angles and checks similar designs in 5000 psi. pres- class. See below to get more data these valves.

nickel cast iron gate valves swing checks now available

eased nickel content gives these es greater corrosion resistance, es them useful on more process s. Priced only slightly higher than inary iron. Sizes 2 to 18 inches. Ask Circular AD-2313—see below.

-type disc globe valves record service 500 psi. ammonia

13 years these forged steel valves e given a large Southern solvents t completely safe, high-pressure monia letdown service at lowest They're still working like new, pletely leak-free. See next page.

literature or data on product d above, please contact Bradbury, Manager, mical Sales Dept. No obligation.

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Pressure Drops for Water Through Valves

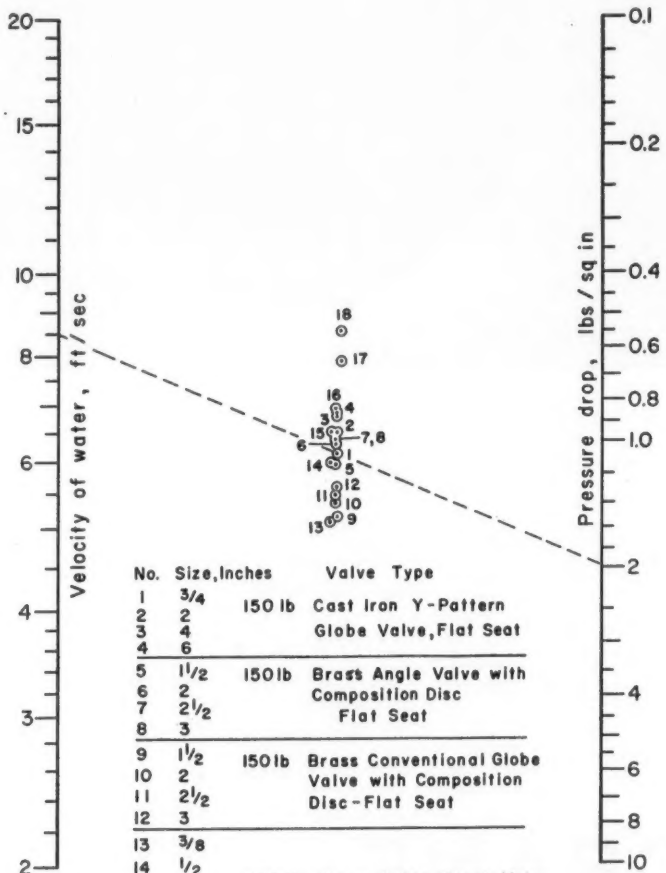
D. S. DAVIS
Head, Dept. of Pulp and Paper Technology
University of Alabama

This nomograph, based on reliable data[1], and constructed by means of well-known methods[2], enables one to estimate pressure drops when water flows through various size and type valves from this particular manufacturer[1].

Broken index line shows that one should expect a pressure drop of 2 lb/in² when water flows through a ¾-in, 150-lb cast iron Y-pattern globe valve with a flat seat at rate of 8.5 ft/sec.

LITERATURE CITED

1) "Flow of Fluids through Valves, Fittings, and Pipe," pp 2-4, Technical Paper #410, Crane Co., Chicago, 1957
2) DAVIS, D. S., "Nomographs and Empirical Equations," Chap 10, Reinhold Publishing Co., New York, 1955



No.	Size, Inches		Valve Type
1	¾	150 lb	Cast Iron Y-Pattern Globe Valve, Flat Seat
2	2		
3	4		
4	6		
5	1½	150 lb	Brass Angle Valve with Composition Disc Flat Seat
6	2		
7	2½		
8	3		
9	1½	150 lb	Brass Conventional Globe Valve with Composition Disc-Flat Seat
10	2		
11	2½		
12	3		
13	⅜	200 lb	Brass Swing Check Valve
14	½		
15	¾		
16	1¼		
17	2		
18	6	125 lb	Iron Body Swing Check Valve

How Commercial Solvents Saves with Crane Valves

Here's a user experience with Crane valves that's worth noting.

In the Commercial Solvents plant at Sterlington, La., ammonia at 4500 psi. is let down to 300 psi. for process requirements. Despite frequent operation on this severe service, Crane No. 225H, 6000-pound forged steel valves have handled it safely since 1945.

More than that—with only routine maintenance—all these Crane plug-type disc globes are still giving leak-free, like-new service. Thirteen years of dependable, low-cost performance under toughest conditions!

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NEW SOLUTIONS

Magnetic grates guard malt firm's product, protect customers

Double benefits are being derived through use of magnetic separators at Northwestern Malt & Grain Company, Chicago, Illinois. Not only do the units assure the output of tramp iron-free malt, but they also protect the malt processing firm's customers against possible machinery damage.

Even a tiny piece of tramp iron can mar the surface of the rollers of a malt mill. Resurfacing costs run about $900. Located in strategic spots throughout the plant's processing lines, groups of the grate-type, non-electric, permanent magnets efficiently remove tramp iron, iron fines, and minute iron particles.

The Alnico V magnetic elements are designed to align iron accumlations parallel with the grates to avoid displacement by material flow. Their magnetic strength is guaranteed indefinitely.

(Magnetic grates are product of Eriez Manufacturing Company, Erie 6, Pennsylvania.)

Check 4986 opposite last page.

Gas cleaning solved in oxygen conversion steel process

Problem of cleaning exhaust gases emanating from oxygen converters in steel plants has been solved by the use of an electrostatic precipitator. The first commercial application is now in successful operation at the Jones and Laughlin Steel plant in Aliquippa, Pa.

The unit is cleaning 238,000 cfm of gas with an efficiency of 99.5%. The gases evolved from the converter consist of 12% CO_2, 12% O_2, 67% H_2, and 9% H_2O. Suspended matter is oxygen converter dust and fume with a concentration of about 11 grains per scf at the precipitator inlet. For each ton of pig iron, about 34 lb of dust is discharged with 90% being

To page 72

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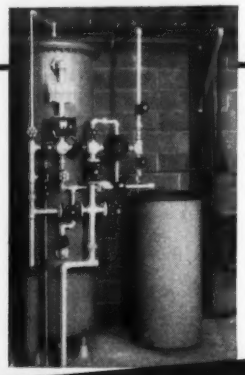

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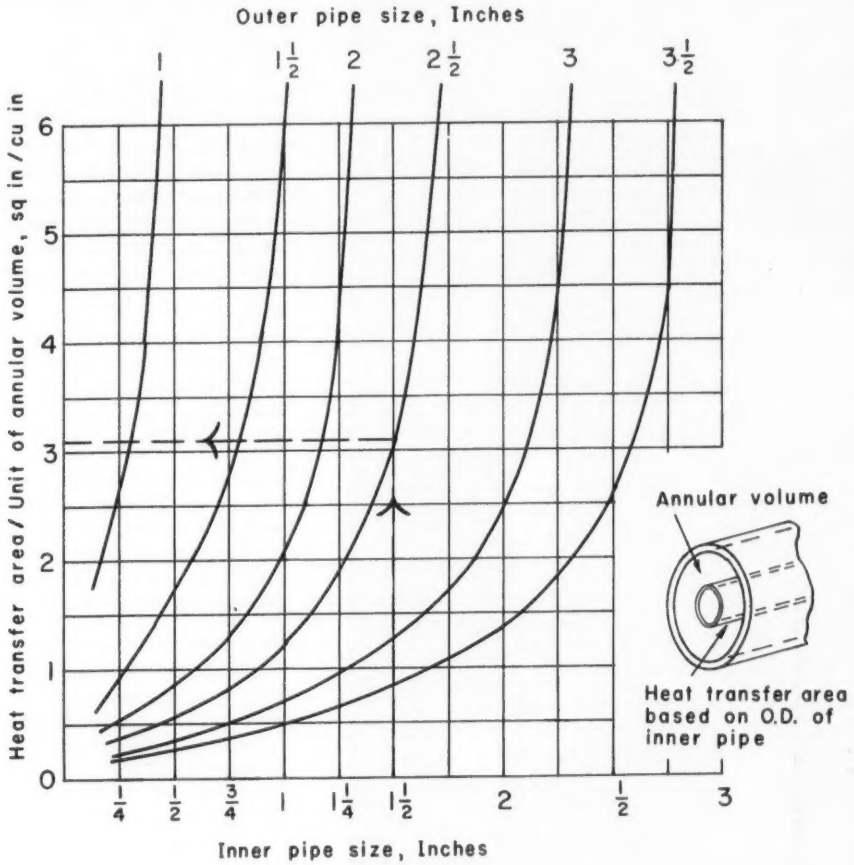
Heat transfer area for an annulus

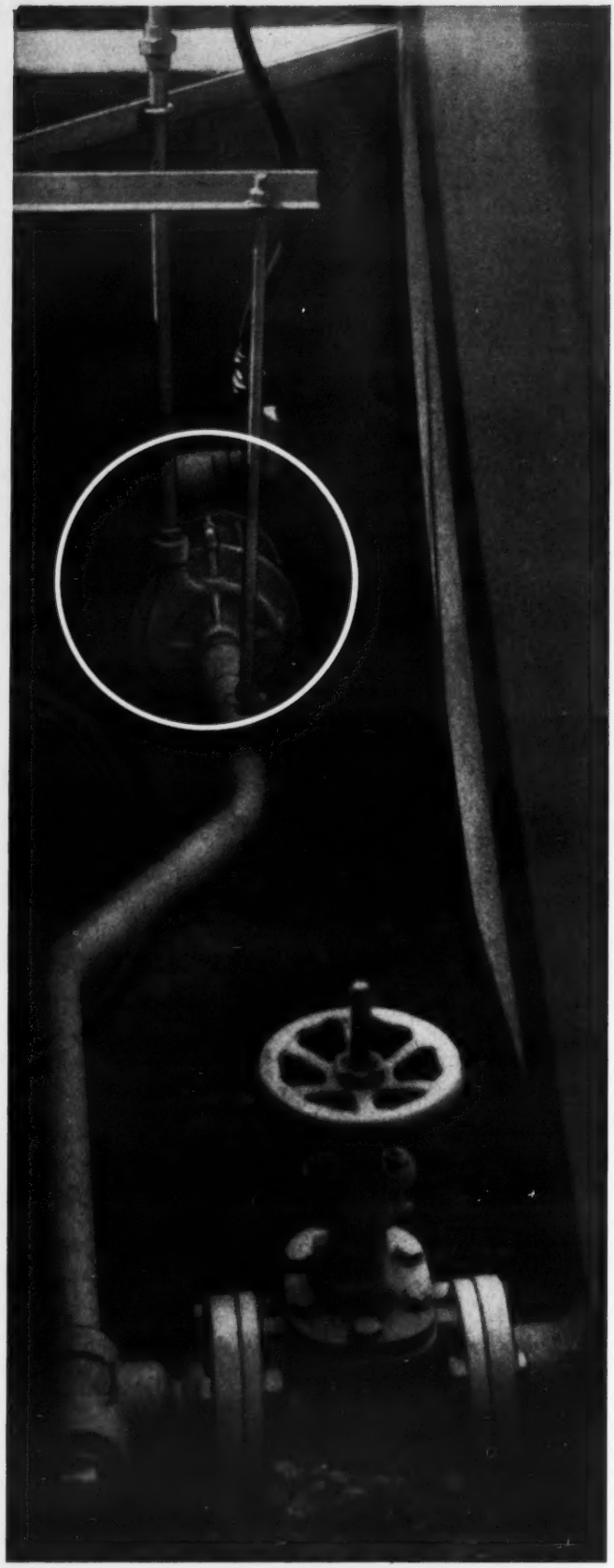
DENNIS E. DRAYER
Dow Chemical Co.
Saran Polymerization Laboratory
Midland, Mich.

Accompanying plot has evolved from a study of heat transfer data obtained from double-pipe reactors. Basically, it correlates heat transfer areas per unit of annular volume for various combinations of pipe sizes. Plot proves extremely useful in scale-up work that involves heat exchangers and tubular reactors.

Arrows show that a heat exchanger consisting of a 1½-inch standard pipe in a 2½-inch standard pipe supplies 3.1 square inches of heat transfer area (based on outer diameter of inner pipe) per cubic inch of annular volume.



Note:
Pipe sizes are nominal.
Heat transfer area based on O.D. of inner pipe.



Chempump saves $1000 a year in maintenance costs

handling sulfuric acid at laminates plant of Panelyte Division, St. Regis Paper Co.

This *Chempump* is part of the phenol recovery process at the Trenton, N. J. plant of St. Regis Paper Company's Panelyte Division. The pump operates intermittently for about ten minutes, three times during each shift of a three-shift day. Since its installation, in July 1955, it has been continually on the job, moving about a thousand pounds of 66° Baumé sulfuric acid every day. No maintenance has been performed on the pump since it was installed—not even a bearing inspection. The plant's maintenance superintendent states that this *Chempump* has saved more than $1000 in maintenance expense during its first year of operation.

Originally, a stuffing box pump was used in this service. Leakage corroded the pump frame and base plate to such an extent that the pump had to be replaced three times. Acid which leaked from the stuffing box also ate away the concrete mounting block.

Leakage problems ended with installation of a *Chempump*. *Chempump can't* leak—in or out—because it has no seals, no stuffing box, no packing. External lubrication is never needed, because the bearings are constantly lubricated by the pumped fluid itself.

Chempump can economically solve the problem of problem fluids in your own plant. For details, write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.

Chempump

First in the field...process proved

Check 4988 opposite last page

From page 70

minus 1 micron in size.

Precipitator is of the horizontal flow plate type. It has two units, each with three 9-ft sections. Gases generated at the converter are burned with excess air and then cooled with water sprays to between 350 and 550°F before entering the precipitator.

Collecting plates in the precipitator are kept clean by automatic magnetic impulse rappers. These are designed so that the cycle and intensity of electrode rapping can be varied to suit operating conditions.

Discharge electrodes are kept clean by high-tension vibrators located on top of the insulator compartments.

Oxygen conversion has been generally heralded as a major step in steel making. Its many advantages, however, have been offset in the past by the serious gas cleaning problem.

(Electrostatic precipitator was supplied by Research-Cottrell, Inc., Bound Brook, New Jersey.)

Check 4989 opposite last page.

Variety of packages replaced by one-style shipping carton

Problem: It was necessary to inventory crating, fiber drums, and ten sizes of cartons to accommodate various bulk products made by Taylor Fibre Company at its Norristown, Pa., and LaVerne, Calif., plants.

Firm manufactures products in forms, of sheets, rolls, rods, tubes, and fabricated parts. Fabricated items are of many shapes, sizes, and materials, each to customer's specifications.

Solution: Company now ships many of its products in two sizes of corrugated Drumpaks. This shipping container is easily handled and may be stacked several high in storage after filling.

It comes knocked down, requiring less warehouse space, and is set up as needed. Interlocking tabs at top and bot-

To page 74

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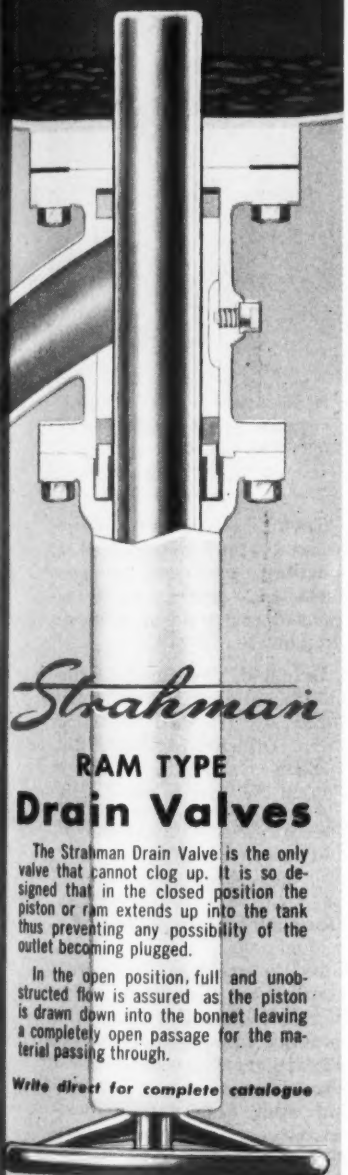
PUSH BUTTON VALVE
that
WILL NOT CLOG UP!
Designed for Chemical and Pharmaceutical Industries



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In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.
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Sinclair Research Laboratories
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Quadratics that appear in chemical equilibria and other equations can be solved quickly and accurately by means of accompanying nomograph which is based on following equation:

$$x^2 + (M)(10^m)(x) + (N)(10^n) = 0$$

where

$$x = (S)(10^m)$$

TYPICAL EXAMPLE

Solve the equation

$$x^2 + 2.2(10^{-10})x - 5.7(10^{-15}) = 0$$

Solution of this equation is found at point of intersection of dashed line from M = 2.2 to N = −5.7 and S curve for 2m−n = −2.

$$x = 23.0(10^{-10}) = 2.3(10^{-9})$$

Other examples are:

a) $x^2 - 5.7(10^{-2})x + 4.9(10^{-4}) = 0$
2m-n = 0; $x = +4.7(10^{-2})$ and $+1.05(10^{-2})$

b) $x^2 - 5.0(10^{-8})x - 5.0(10^{-14}) = 0$
2m-n = −2; $x = 25(10^{-8}) = 2.5(10^{-7})$

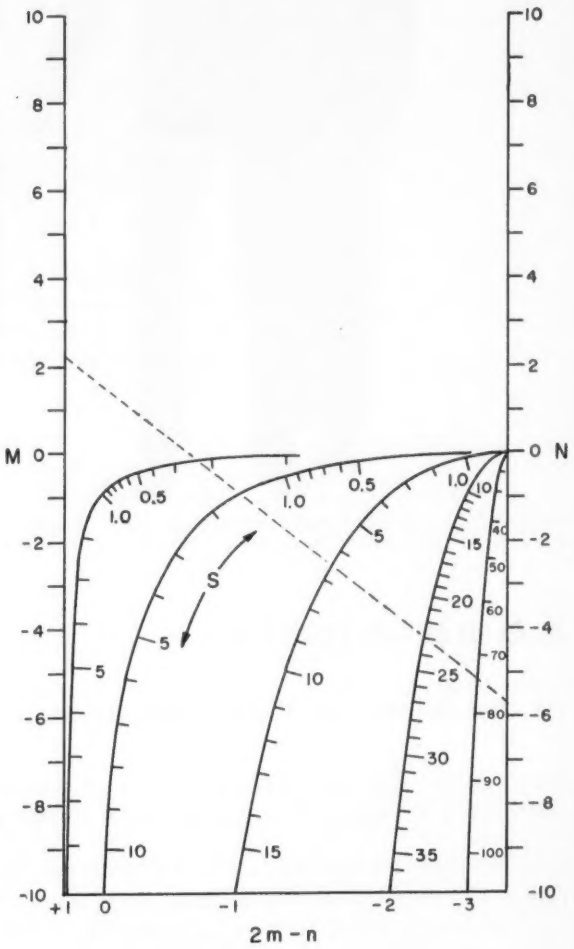
c) $x^2 + 5.0(10^{-8})x + 5.0(10^{-14}) = 0$
no positive real roots

Notes:

1. Graph (including approximations mentioned in note 2 below) gives all positive real roots of the quadratic equation. Negative and imaginary roots which have no significance in chemical equilibria problems, do not appear.

2. When 2m−n is greater than +1 or less than −3, solution lies close to one of the three axes. Significance of this is that one of three terms of the quadratic equation is negligible.
Appropriate solution is found as follows:

- For roots lying close to M axis, the approximation $x = -M(10^m)$ is valid
- For roots lying close to N axis, the approximation $x = (-N \times 10^n)^{1/2}$ is valid



- For roots lying close to horizontal axis, $x = (-N)(10^n)/(M)(10^m)$ is valid

Examples of this are:

d) $x^2 - 4(10^{-3})x - 7(10^{-8}) = 0$
2m-n = +2; $x = 4(10^{-3})$

e) $x^2 + 2(10^{-8})x - 3(10^{-11}) = 0$
2m-n = −5; $x = (3 \times 10^{-11})^{1/2} = 5.48(10^{-8})$

f) $x^2 + 4(10^{-8})x - 9(10^{-20}) = 0$
2m-n = +4; $x = +9(10^{-20})/4(10^{-8}) = 2.25(10^{-12})$

Look again

At the New, Field-proved Quantichem Instrument

Here is a unit that automatically analyzes process liquids colorimetrically . . . performs *all* the steps of a manual analysis without an operator's attention.

This industrial process tool has been tested and proved in field installations . . . can be used to automate many colorimetric analyses not requiring filtration or boiling. Instruments for water analyses measure silica 0 to 0.05 PPM (parts per million), total hardness 0 to 3 PPM, iron 0 to 100 PPM, and phosphates.

Take a second look at these in-plant process instruments . . . see how they can be applied to your problem. Write for Bulletin 1156 on the Quantichem colorimetric analyzer . . . *Suncoast Instrument Division*, Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania. Engineering representatives throughout the world.

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CHEMICAL INSTRUMENTATION SYSTEMS

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • Anders Air and Gas Dryers

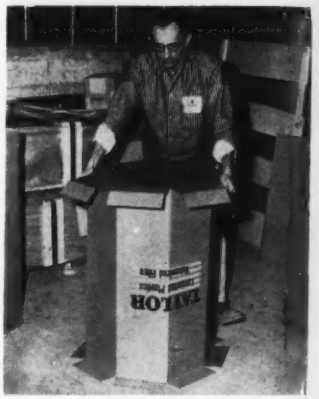
Check 4991 opposite last page

NEW SOLUTIONS

From page 72

tom are held in place by steel strappings.

Results: Reduction of investment in container inventory has been realized in addition to lower handling and outgoing freight bills due to less tare weight.



Eight-sided corrugated shipping container comes knocked down, reducing storage space for empties

Taylor's customers have expressed approval of ease of handling and storing new container. Many have requested this type of container exclusively.

("Drumpak" corrugated shipping container is manufactured by Gaylord Container Corp., Division of Crown Zellerbach Corporation, 111 N. Fourth St., St. Louis 2, Mo.)

Check 4992 opposite last page.

Floor surfacing problem?

Cited in problem, application, result form, five installations of monolithic floor surfacing material in critical plant and outside areas are described in eight-page booklet. Test data indicating that material has a tenacity and bonding strength 40 times greater than concrete are included. Methods for application over concrete, wood, mastic, and other surfaces are described. Monile Booklet — The Master Mechanics Company, 2097 Columbus Rd., Cleveland 13, Ohio.

Check 4993 opposite last page.

Mr. S. Miwa, Plant Manager, and Mr. S. Hayashi, Managing Director of Nippon Petrochemicals

Petrochemical Plant Meets JAPAN'S Needs for Isopropyl Alcohol

Flexible, highly instrumented installation also furnishes most of country's requirements for acetone. Both products are made at high yields and purities. Plans have been made for new plants to make other petrochemicals

The Fourth of July has become a big day for Nippon Petrochemicals Co., Ltd (NPCC), a subsidiary of Nippon Oil Company (NOC). On this day, in 1957, the first isopropyl alcohol (IPA) and acetone units built in Japan were placed on stream by the company at Kawasaki. Effect of this successful operation has been great. Importation of all IPA and substantial quantities of acetone is no longer necessary, resulting in a considerable saving of foreign funds. This is but one example of how the economies of many countries are being brought to a higher level through the development of petrochemical products.

The Nippon Petrochemicals plant was designed for production of 4.4-million lb of 99% IPA and 7.7-million lb of 99.5% acetone per year. Plant has been operated at above design rates, with products bettering required specifications, since shortly after the startup. Actual yields experienced have substantiated design bases, with about 0.76 lb of propylene consumed per pound of IPA produced, and approximately 1.06 lb of IPA required per pound of acetone.

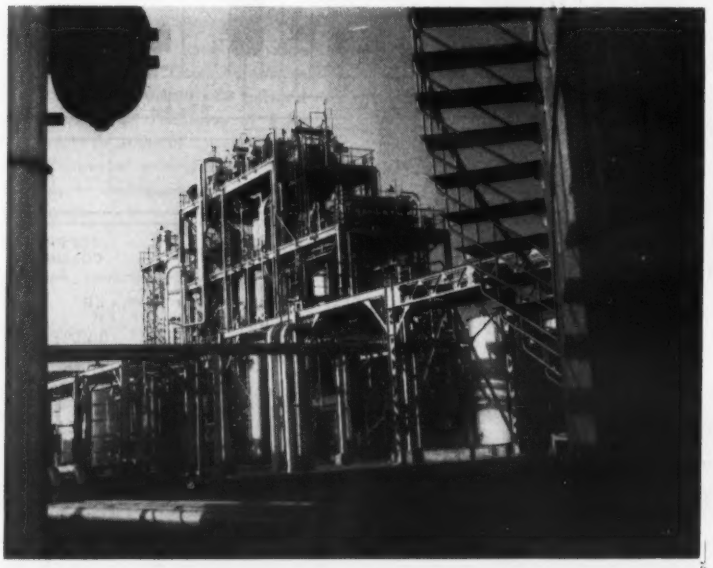
This is the first time in Japan that any petrochemical plant utilizing refinery gas as feed has operated successfully from the very start. NPCC personnel had expected that numerous startup difficulties would be experienced because of the complicated process requirements and the highly corrosive fluids handled. However, the units went on stream smoothly.

Nippon Oil Company has increased the flexibility of its refining operations by incorporating this petrochemical plant in its overall scheme. Considerable flexibility was designed into the petrochemical plant itself so that it can be readily operated for greater IPA and less acetone production, or vice versa, depending on market demand, which in Japan can fluctuate over wide limits. The example of Nippon Oil is being followed by all leading refiners in Japan to enable them to meet the changing pattern and fluctuating demand for petroleum and petrochemical products.

Plant Process

The IPA-acetone plant is based on processes which consist of esterification of propylene, hydrolysis of ester, purification of isopropyl alcohol, dehydrogenation of isopropyl alcohol, and purification of acetone.

Charge to the IPA unit is a liquid mixture of propane and propylene. This mixture is separated from the cracked gas produced in the fluid catalytic unit at the Yokohama Refinery



Processing section of the Japanese isopropyl alcohol and acetone plant

Japanese Petrochemical Plant *From preceding page*

of Nippon Petroleum Refining Co., Ltd., jointly owned by NOC and California Texas Oil Co., Ltd. Feedstock is transported some seven miles to Kawasaki by tank truck.

Liquid hydrocarbon feed and recycle are mixed and contacted with approximately 75% sulfuric acid in agitated absorbers, to form esters of propylene.

Unreacted propane, after treating, is piped to Nippon Petroleum Gas Company (NPGC), where it is bottled and sold as domestic and industrial fuel. NPGC is a wholly owned subsidiary of NOC and is located adjacent to NPCC's IPA-acetone plant.

Propylene esters formed in the absorbers are hydrolyzed to form isopropyl alcohol and small quantities of ether and polymer. Crude isopropyl alcohol vapors are stripped from the acid with steam. They are then washed with dilute caustic soda and water, and condensed. Unreacted propylene, after washing, is compressed, condensed, and recycled to feed tank. Spent acid from hydrolyzer-stripper is charged to a Mantius-type acid concentrator, where it is reconcentrated for recycle to the absorbers.

Crude isopropyl alcohol, containing water, isopropyl ether (IPE), and a small amount of polymer is charged to the IPE column. Bulk of overhead vapors is returned to tower as reflux. A portion of the liquid rich in ether is recycled to the absorber. Bottoms, containing IPA, polymer, and water, are fed to the IPA column. Azeotropic IPA is obtained from the top of the column, polymer is removed as a side stream, and water is withdrawn from the bottom. Part of the azeotropic IPA is further purified to 99% IPA while remainder is charged to acetone unit.

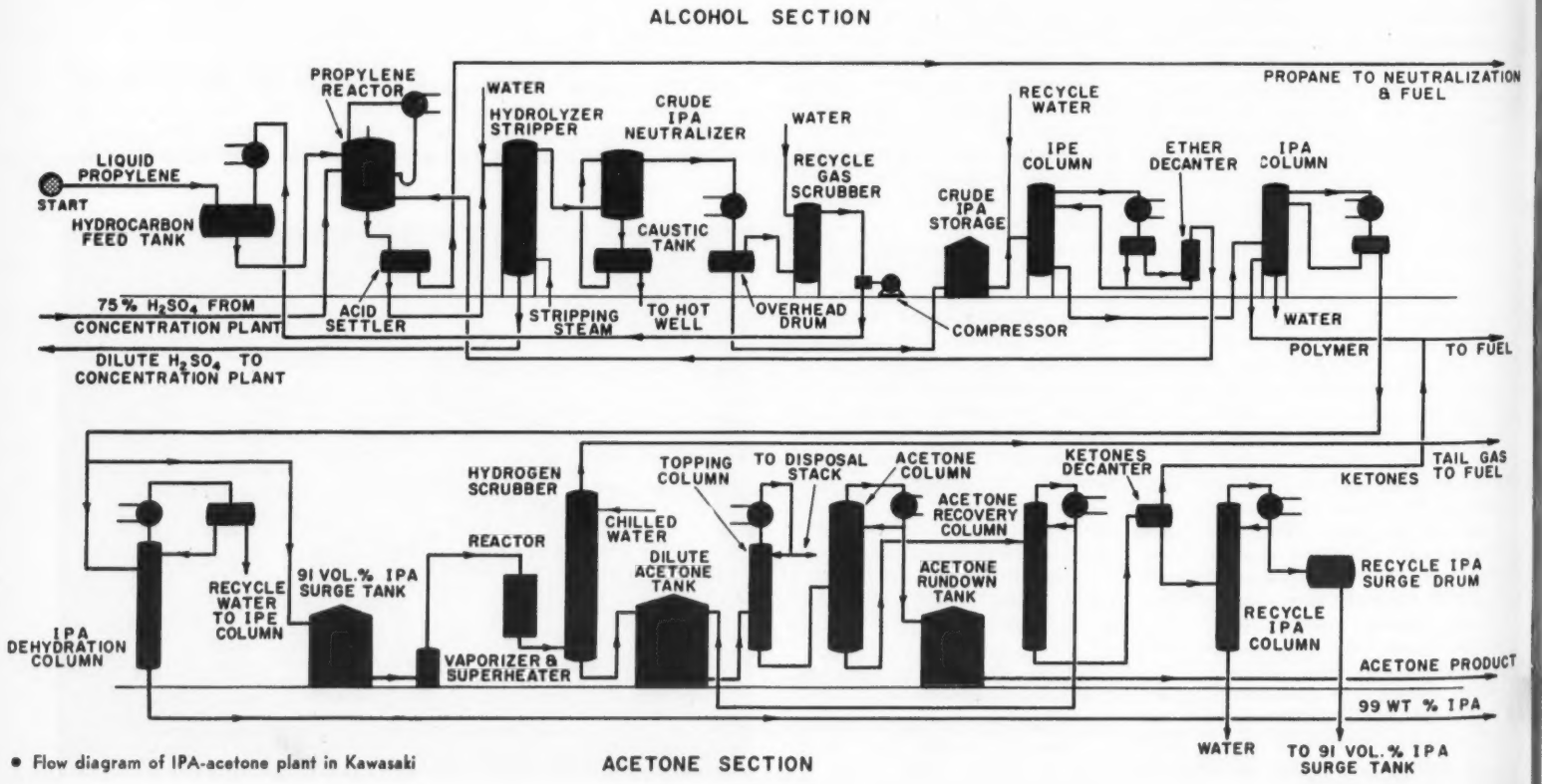
In the acetone unit, IPA is dehydrogenated to form acetone. Reaction products are cooled and scrubbed with water. Hydrogen is released to fuel system.

Crude acetone is fractionated in a series of columns. Low-boiling impurities are first removed overhead in a topping column. Acetone column takes specification acetone product overhead, and its bottoms are pumped to two final towers. In the first, a small amount of crude recycle acetone is separated. In the second, unreacted IPA is recovered for recycle to acetone reactors.

Storage area of the Nippon Petrochemicals plant

Because of automatic instrumentation incorporated in plant, very little manual control is required. Override instrumentation is employed at strategic points in the process and various alarm circuits give ample warning when important process adjustments are needed. A complete and well-equipped control laboratory, including gas chromatography facilities, is located on the plant.

Nippon Oil Company, the oldest petroleum company in Japan (established in 1888), is carrying out a long-range program of petrochemical development through its subsidiary, Nippon



• Flow diagram of IPA-acetone plant in Kawasaki

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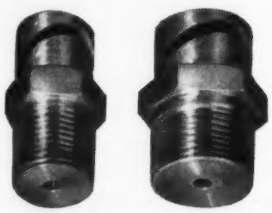

Bar stock Fan-spray-type

Yarway Spray Nozzles are available in two types—the Yarway Involute producing fine hollow cone spray with minimum energy loss, and the Yarway Fan-spray for flat fan-shaped spray with time-saving slicing action for cleaning.

Ask for a free copy—Bulletin N-618.

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Check 4994 opposite last page

Petrochemicals. Completion of the IPA and acetone plant is but the first step.

Ethylene and Butadiene

Now being designed are facilities for production of ethylene and butadiene. The ethylene plant will be the largest outside of North America. Large quantities of propylene, co-produced with the ethylene, will be used by NPCC and/or by others for the production of detergent alkylate, polypropylene, propylene oxide, cumene, and other propylene derivatives in the future. Kawasaki will be one of the three major petrochemical centers in Japan: the Mitsui Group in Western Japan; the Mitsubishi Group in Central Japan; and the NPCC Group in Eastern Japan.

Group Members

The NPCC Group companies consist of Showa Yuka and Furukawa Kagaku, both of which wil produce polyolefins; Asahi Kasei, Asahi-Dow, and Nippon Shokubai, which will produce ammonia, monostyrene, and ethylene oxide, respectively. Nihon Geon, also a member company of the Group, will use the butadiene for its synthetic rubber production.

(Valuable assistance was provided in the preparation of this article by Messrs. S. Hayashi, Managing Director, S. Miwa, Plant Manager, and G. R. Negishi, Manager Technical Division, all of Nippon Petrochemicals.)

(IPA-acetone plant was designed by Stone & Webster Engineering Corporation, 90 Broad St., New York 4, N.Y. In addition to designing the plant for NPCC, this company provided advisory services in connection with its construction and initial operation. Stone & Webster is now designing the facilities for production of ethylene and butadiene at the same location.)

(IPA-acetone plant is based on processes developed by The Distillers Company Limited and British Hydrocarbon Chemicals Limited.)

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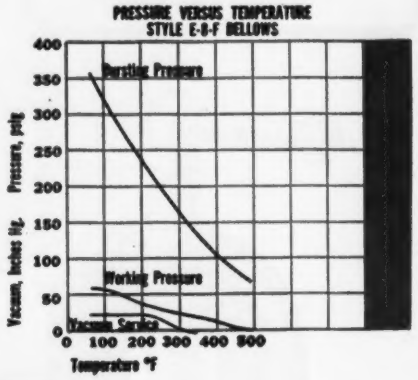

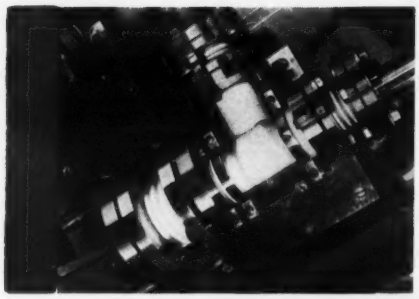

2. ***For the first time in the industry*** **each Doré Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon, is cycled with cold water at pressures 50% greater than recommended operating pressures prior to shipment.**

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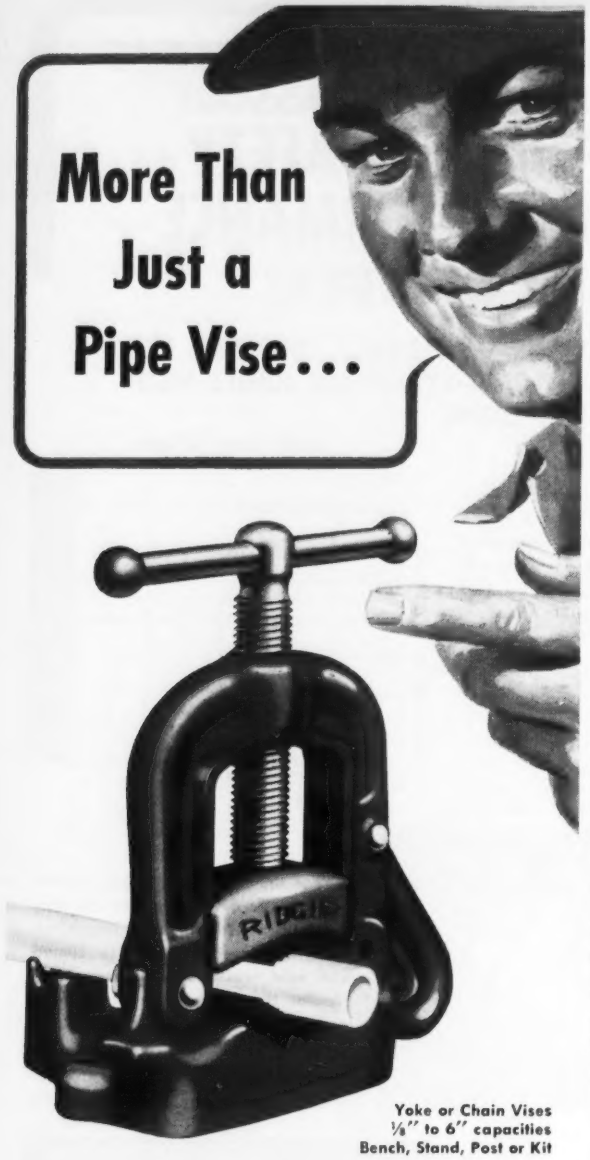

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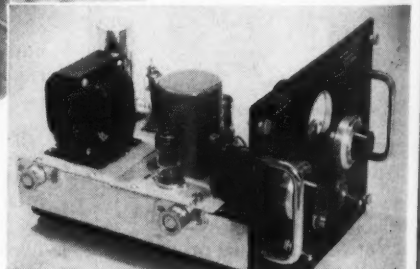
PETROCHEMICALS

Stauffer Chemical Company controls the economics of its carbon bisulfide operation by continuous infrared analysis of 'tail' gases

IR analyzer *'balances'* process economics

Engineer reading recording chart of infrared gas analyzer on methane in carbon bisulfide stream

Control unit of gas analyzer



WILLIAM C. CLARKE, Assistant Editor
With **E. J. LUERICH,** Plant Superintendent
and **ALVIN SCHALLIS,** Process Engineer
Stauffer Chemical Company
Le Moyne, Alabama

Problem: Vapor phase reaction of methane and sulfur at Stauffer Chemical Company's Le Moyne petrochemical plant in manufacturing carbon bisulfide seldom goes to 100 percent completion. To control the reaction, some means is necessary to determine unreacted or excess methane.

While large amounts of hydrogen sulfide furnish a good "background" for infrared analysis, chief need of instrument at this point is speed and dependability . . . to assure minimum time lag to assure ready control of the reaction.

Solution: Installing an infrared gas analyzer on the process stream, Stauffer Chemical Company not only controls the reaction but also economics of its bisulfide operation.

Sample stream is metered into the analyzer at a maximum rate to insure minimum time lag. Instrument is easily checked by operator by pushing buttons that operate solenoid valves. These divert the unknown gas stream and introduce known samples of methane into instrument. Infrared analyzer monitors the gas for methane to an accuracy of about 0.2% in 0 to 7% range. By observing the amount of methane in the tail gas, op-

erator makes changes in the plant gas streams to keep the reaction in balance.

Instrument is the positive, non-dispersive type, easily coupled to a recorder or recorder-controller for fully automatic process stream control. Stauffer has installed a recorder, and achieved the information for manual control.

Gas analyzer operates on principle that gases absorb infrared energy at various wave lengths. This absorption increases the temperature and hence pressure of a fixed vollume of gas proportional to amount of energy absorbed.

Detector is sensitized by filling both chambers to same pressure; chambers are separated by diaphragm-condenser. When infrared energy falls on detector, energy is absorbed only in region where the sensitizing gas has absorption bands, making instrument highly selective. If sample gas is in process stream flowing through sample cell, infrared energy proportional to concentration will be absorbed, and less energy reaches the detector. An imbalance generates an electrical signal.

Results: As a matter of course, operator of carbon bisulfide unit "balances" the process by infrared analyzer and avoids upsetting sulfur recovery unit. By observing amount of methane in the tail gas, operator can make proper changes in plant gas streams. Plant personnel say the analyzer does an excellent job. Only minor maintenance has been required. Accuracy of unit has been excellent.

(Infrared gas analyzer is product of Process Instruments Div., Beckman Instruments, Inc., Fullerton, Calif.)

Check 4997 opposite last page.

Data on Belgian chemical

Bulletin of 20 pages describes use of new Belgian polyethylene glycol for the prevention of caking of ammonium sulphate. "Tensiorex P" Bul — Belgian Industrial Information Service, 630 Fifth Ave., New York 20, N. Y.

Check 4998 opposite last page.

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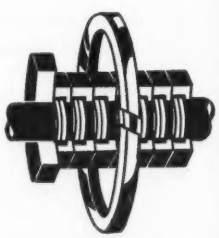

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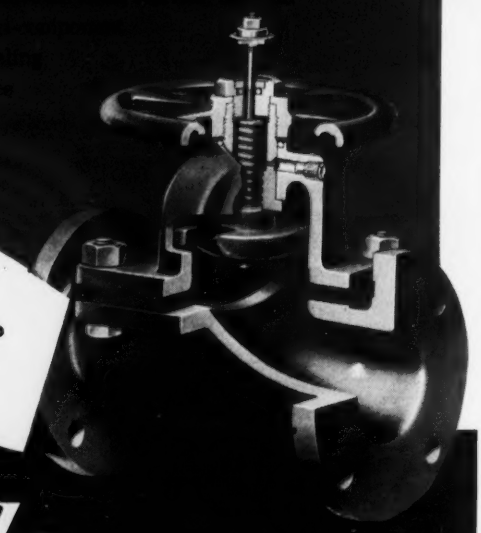

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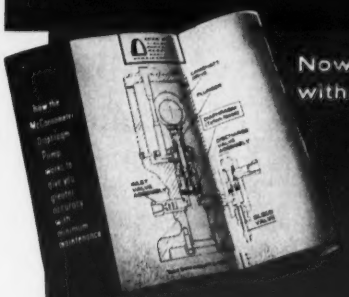
THE PEOPLE WHO ____ AND ____ FLOW



Now . . . Precision Fluid Metering with

Check 5000 opposite last page

Twelve stories high . . .

. . . this 120'-long tower is being shipped from Baton Rouge, La., where it was fabricated to a large petrochemical plant in Texas. Weighing 170,000 lb, and with an interior diameter ranging from 78 to 96", the giant deethanizer contains 40 processing trays.

(Deethanizer tower was fabricated by Delta Tank Mfg. Co., subsidiary of General Gas Corp., Baton Rouge, La.)

Check 5001 opposite last page.

(Tower was engineered and erected by The M. W. Kellogg Company, Div. of Pullman, Inc., 711 Third Ave., New York 17, New York.)

Circle 5002 opposite last page.

Power actuators

Company's complete line of pneumatic power actuators are described in 12-page booklet. Operation is described and more than 20 applications are illustrated. Bul B-50-3 — Conoflow Corporation, 2100 Arch St., Philadelphia 3, Pa.

Check 5003 opposite last page.

Turbine flow pickups ease petrochemical control problems

Sensors combine easily with electronic systems

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Features: Turbine flow pickups are easily installed, and combine naturally with

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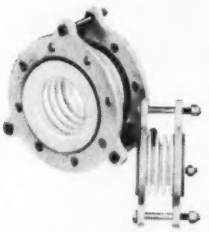

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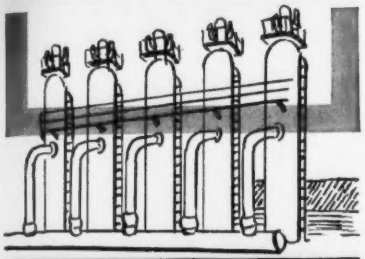

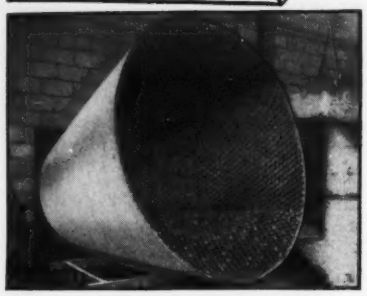

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electronic process control instrumentation.

Description: Fluid flow is measured by precisely determining fluid velocity through a passage. This contains a freely spinning turbine wheel. As speed of turbine rotation is proportional to flow rate, number of revolutions serves to measure flow. Accuracy is within ½% of calibration.

Turbine flow meter handles liquids or gases

Standard units are designed for specific gravity in range of 0.5 to 1.0. Gases having densities down to 0.5 lb/cu ft can be handled with slightly modified designs which provide accuracy equal to that obtained in more dense fluids. Units have even been made for densities down to that of air at atmospheric pressure — about 0.08 per cubic foot. Pipe sizes are to 6".

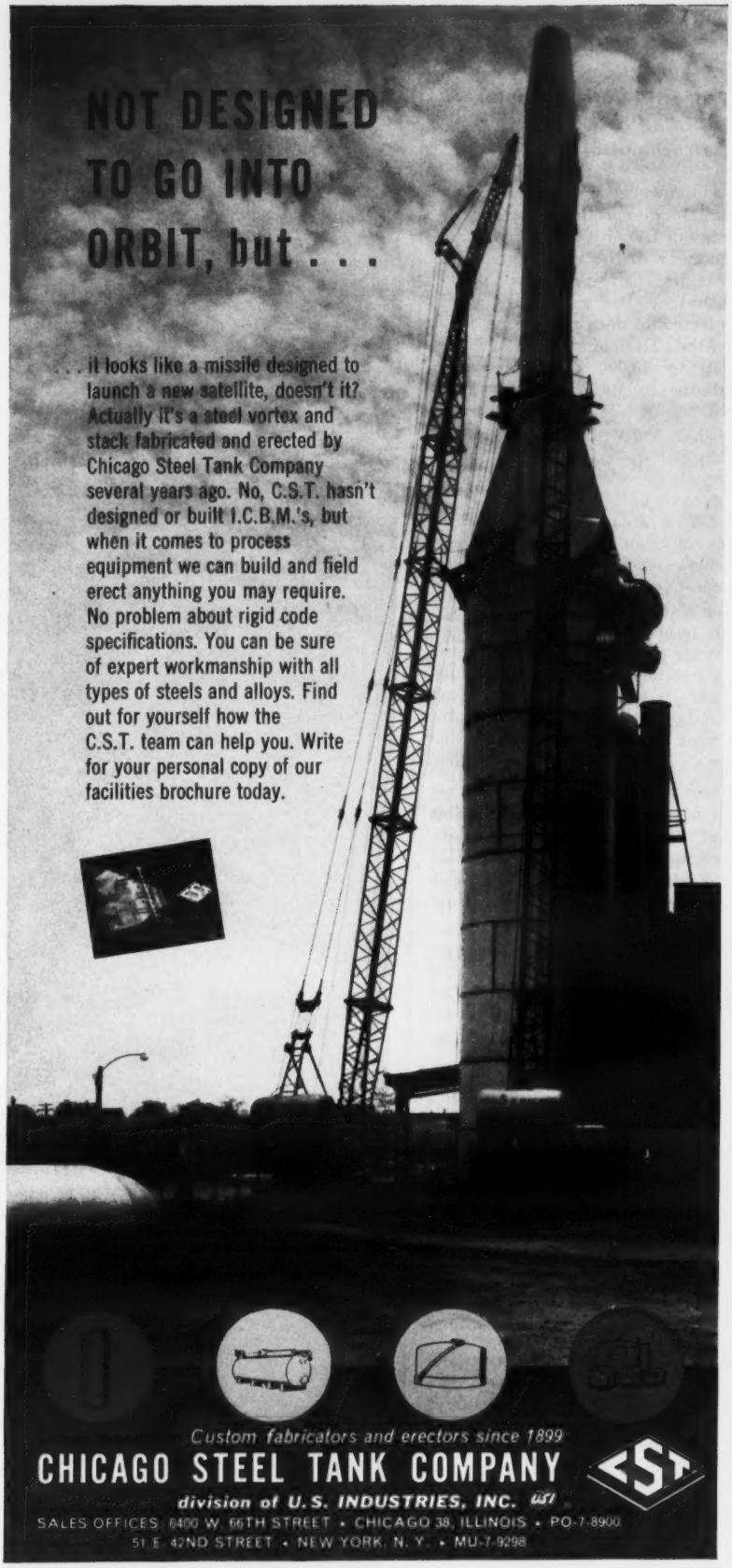
(Model FL flow pickups are product of Waugh Engineering Co., 7842 Burnet Ave., Van Nuys, Calif.)

Check 5006 opposite last page.

Tubes for condensers, heat exchangers

Manual of 44 pages discusses the application and installation of copper and copper alloy condenser and heat exchanger tubes. Plates for tube sheets, heads, and baffles are also covered. Included is review of corrosion factors in condenser tube service. Pub B-2 — Dept. SR, The American Brass Co., Waterbury 20, Connecticut.

Check 5007 opposite last page.


NOT DESIGNED TO GO INTO ORBIT, but . . .
. . . it looks like a missile designed to launch a new satellite, doesn't it? Actually it's a steel vortex and stack fabricated and erected by Chicago Steel Tank Company several years ago. No, C.S.T. hasn't designed or built I.C.B.M.'s, but when it comes to process equipment we can build and field erect anything you may require. No problem about rigid code specifications. You can be sure of expert workmanship with all types of steels and alloys. Find out for yourself how the C.S.T. team can help you. Write for your personal copy of our facilities brochure today.
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Check 5008 opposite last page

Powerful data computer installed by German petrochemical firm

Farbwerke Hoechst A. G., an important producer of petrochemicals in Germany, and pioneer in the development of Ziegler low-pressure polyethylene, has installed a giant electronic data processing machine. The computer can store up to 40,000 characters and digits in its "memory" unit and is one of the most powerful in the world. It is the first unit of its size to be installed by a private European company.

The huge 24-unit computer is expected to greatly increase the speed and efficiency of the company's voluminous accounting operation, including a payroll for 43,000 employees, inventory control, and personnel statistics. In addition, it will work on technical and scientific research problems related to the highly varied Hoechst production program.

(Information on installation of IBM 705 electronic data computer courtesy of IBM World Trade Corporation, 821 United Nations Plaza, New York 17, N. Y.)

Check 5009 opposite last page.

"Why can't you keep me waiting like other companies do?"

Thanks to Harold Money, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

Masoneilan Model 4811 D. P. Transmitters

Give You Top Performance

These essential features of the Masoneilan design assure optimum performance in differential pressure, flow or liquid level applications . . .

- **Accuracy** within 1% of range span, plus fast response, and minimum hysteresis and nonlinearity. There is no distortion due to outside forces acting on cover and damping is built in at measurement source. Static pressure effect is less than 0.2% per 100 psi change.
- **Rugged Construction** provides complete protection due to overload, negative differential or overranging. Rigid mounting for horizontal or vertical surfaces. All working parts exposed to process fluid are made of Type 316 stainless steel. Extra heavy beam avoids bending.
- **Versatility** — range adjustable between 20 and 200 inches of water; suppression up to 50 inches. Suitable for differential pressure, flow, or liquid level applications.

Investigate all the advantages these improved transmitters offer you. Bulletin with full specifications sent on request.

MN7-40

MASON-NEILAN

Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

MASONEILAN

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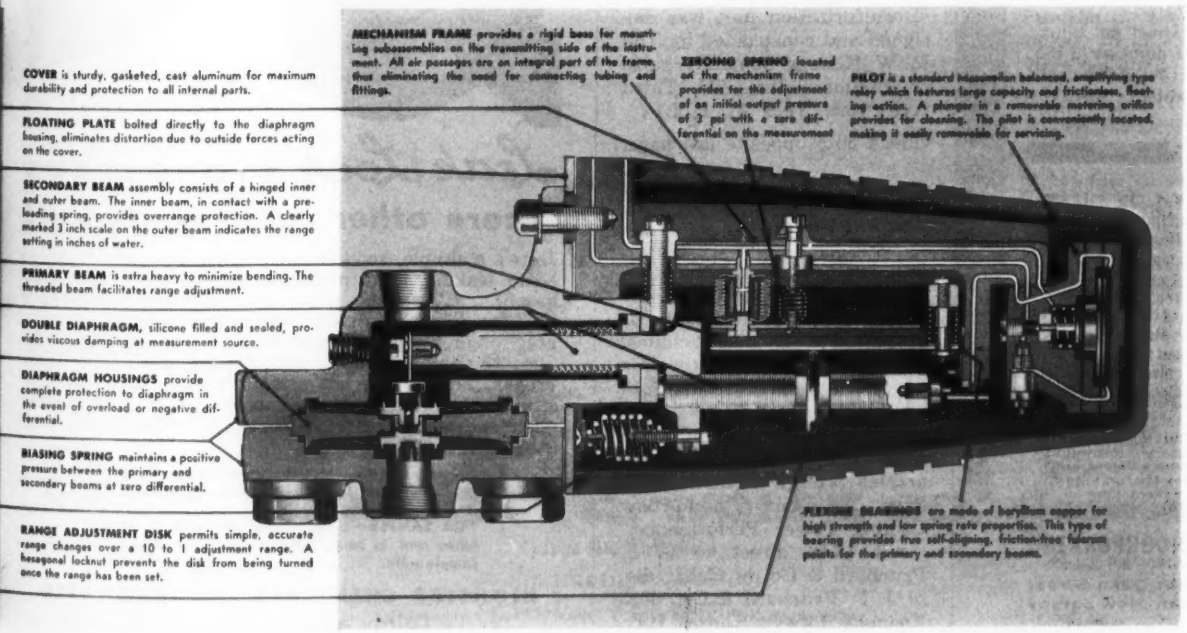
Worthington SIPEC, Milan, Italy
Distributors in many other overseas countries


COVER is sturdy, gasketed, cast aluminum for maximum durability and protection to all internal parts.
FLOATING PLATE bolted directly to the diaphragm housing, eliminates distortion due to outside forces acting on the cover.
SECONDARY BEAM assembly consists of a hinged inner and outer beam. The inner beam, in contact with a preloading spring, provides overrange protection. A clearly marked 3 inch scale on the outer beam indicates the range setting in inches of water.
PRIMARY BEAM is extra heavy to minimize bending. The threaded beam facilitates range adjustment.
DOUBLE DIAPHRAGM, silicone filled and sealed, provides viscous damping at measurement source.
DIAPHRAGM HOUSINGS provide complete protection to diaphragm in the event of overload or negative differential.
BIASING SPRING maintains a positive pressure between the primary and secondary beams at zero differential.
RANGE ADJUSTMENT DISK permits simple, accurate range changes over a 10 to 1 adjustment range. A hexagonal locknut prevents the disk from being turned once the range has been set.
MECHANISM FRAME provides a rigid base for mounting subassemblies on the transmitting side of the instrument. All air passages are an integral part of the frame, thus eliminating the need for connecting tubing and fittings.
ZEROING SPRING located on the mechanism frame provides for the adjustment of an initial output pressure of 3 psi with a zero differential on the measurement
PILOT is a standard Masoneilan balanced, amplifying type relay which features large capacity and frictionless, floating action. A plunger in a removable metering orifice provides for cleaning. The pilot is conveniently located, making it easily removable for servicing.
FLEXURE BEARINGS are made of beryllium copper for high strength and low spring rate properties. This type of bearing provides true self-aligning, friction-free fulcrum points for the primary and secondary beams.

Check 5010 opposite last page

Tall tower trek taken by 208' butane splitter

A high-tensile, carbon-steel column 208' long, 14' in diameter, and weighing 294 tons will be the tallest structure in the Lake Charles area when installed. The fractionating column is designed to serve as a butane splitter in an isomerization process.

The huge column was transported on six special railroad flat cars. Each of the cars had a device which enabled the column to pivot when the train rounded a curve.

Butane splitter in isomerization process is 208' long, weighs 294 tons

A foundation containing 375 cu yd of concrete reinforced with 30 tons of steel will hold the column in place. Forty anchor belts will secure the tower to the foundation which has been engineered to protect against hurricane-type winds up to 125 mph.

(Fractionating column was engineered and constructed by Tellepsen Petro-Chem Constructors, Div. of Tellepsen Construction Co., Houston, Texas.)

Check 5011 opposite last page.

(Column was fabricated by Wyatt Metal & Boiler Works, 6200 Kansas, Houston, Texas.)

Check 5012 opposite last page.

Thermal conductivity

Bulletin of six pages describes and illustrates gas analysis thermal conductivity cells for chromatography and "on stream" instrumentation. Bul TCTH-12-57 — Gow-Mac Instrument Company, 100 Kings Rd., Madison, N. J.

Check 5013 opposite last page.

PROCESS ENGINEERS...

control small flows

with finger tip accuracy

on

Aircraft and Automotive Test Stands
Hydraulic Equipment
Pneumatic Equipment
Gas Analyzers
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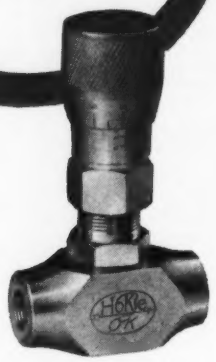


280 SERIES
METERING VALVES

Two orifice sizes of 1/16" and 1/8" are available with flow controlled by an 8-degree needle point taking 20 turns to move from open to closed position. In brass with O-ring stem seal or in 316 stainless with Teflon packing. For service to 3,000 psi; operating temperatures from −60° to 450°F. All valves have panel mounting lock nut.

Vernier Modifications

Hoke's #280-25 micrometer hand-wheel kit (illustrated) helps you establish a reference point as to the number of turns required for any flow rate. A low-cost, high-value accessory for precision control.

A SPECK OF DUST

in metered fluid is all it takes to change the orifice setting in Hoke's highly-sensitive 280 Series valve. For critical metering requirements, it's always wise to use this 540 Series Micron Filter to keep foreign matter away from the valve. Complete information on request.

Why buy big when you can buy Small

Hoke's Catalog MV-957 has all necessary information on 280 Series Valves and 540 Series Micron Filters. Yours for the asking.

HOKE

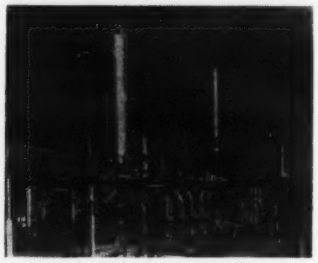
HOKE INCORPORATED
FLUID CONTROL SPECIALISTS
145 South Dean Street
Englewood, New Jersey

Check 5014 opposite last page

PETROCHEMICALS

Desulfurization unit at Martigues, France, on stream

Designed and constructed by US company, a new desulfurization unit at Compagnie Francaise de Raffinage's Provence Refinery, Martigues, France, has recently gone on stream. Unit is designed to remove 85% of the sulfur from



Recently placed on stream, desulfurization unit at Martigues, France was designed for dual operation

12,500 BPD of a 80/20 blend of virgin gas oil and light catalytic cycle oil. Cobalt Molybdate catalyst is employed for the reaction.

The unit is also designed to accommodate straight-run naphtha and kerosene as alternate feed stocks. Desulfurization to about 75% is expected for alternate operations.

(Desulfurization unit was designed and constructed by The M. W. Kellogg Company, subs. of Pullman, Inc., 711 Third Ave., New York 17, N.Y.)

Check 5015 opposite last page.

Cooling towers

Reliable and complete information on cooling tower selection and performance is presented in 86-page technical manual. Design of cooling towers is made straightforward and simple. Simplicity is aided by a large number of charts in color. Actual examples are given and calculated. To obtain "Counterflow Cooling Tower Performance," remit $3.00 direct to J. F. Pritchard & Co. of Calif., div. of J. F. Pritchard & Co., 4625 Roanoke Pkwy., Kansas City, Missouri.

Specify **KNOX TOWER PACKINGS**

PORCELAIN

RASCHIG RING

Save Time and Money on

KNOX Tower Packings

for Initial Installations as well as Replacements, because

- Uniform Quality
- Zero Porosity
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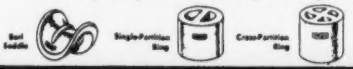
- High Strength
- KNOX produces porcelain Tower Packings from same composition as is used for High Voltage Electrical Porcelain

Further information, prices and samples gladly furnished upon request.



KNOX PORCELAIN CORP.
KNOXVILLE I, TENNESSEE

Check 5016 opposite last page

Leak Lock STOPS LEAKS

where other compounds fail!

Here's a simple, economical solution to many troublesome leaking joint problems. Leak Lock holds LP, gasoline, oils, gases, petro-chemicals and refrigerants that eat through ordinary joint compounds. Its remarkably tough, highly adhesive, remains flexible indefinitely . . . the joint compound that stretches rather than breaks. Years of use have established its advantages in stopping wasteful or hazardous leaks in the petroleum, chemical, atomic energy, electronic, refrigeration and other fields.

Approval by Underwriters' Laboratories for Gas and Oil Equipment List: Also for Propane and Butane.

FREE SAMPLE—Leak Lock is available in handy tubes and in cans. Write on your letterhead for sample tube.

HIGHSIDE CHEMICALS INCORPORATED
16 Colfax Avenue • Clifton, N. J.

Check 5017 opposite last page

Fifth annual feature on corrosion

The July 1958 issue of CHEMICAL PROCESSING will highlight corrosion control. This will again emphasize ways, means to cut the six-billion-dollar yearly loss from corrosion.

It continues CP's five-year editorial program on combating corrosion carried on in monthly section.

About 50 pages of latest information on subject will appear in the feature.

Article charts trends

Feature will contain an article by an outstanding authority in corrosion control field, telling of trends and developments during this past year.

Technical papers

Condensations of recent technical papers by specialists on corrosion will also appear in the section.

Corrosion Keys

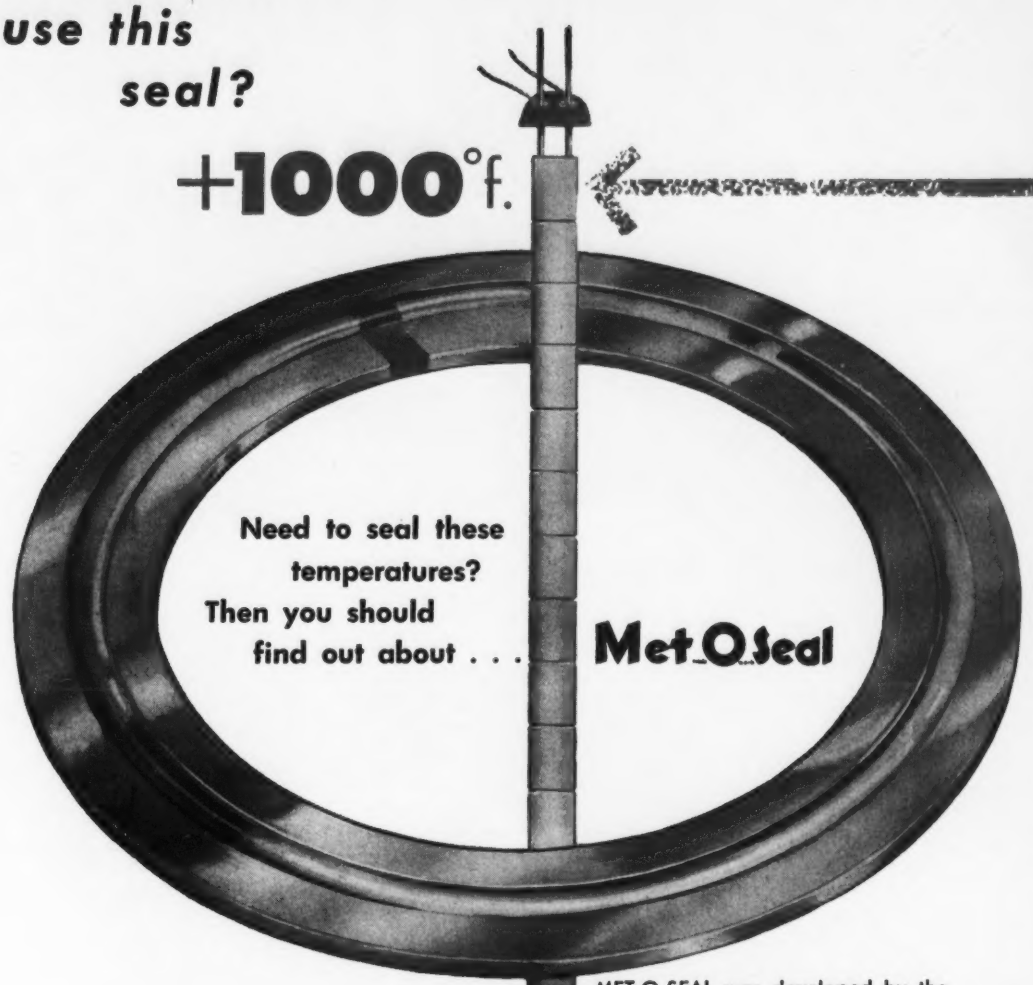
More of the high-interest Corrosion Key data charts on materials of construction will be carried.

Performance reports

Case history articles will tell how problems have been solved in plants.

can you use this seal?

+1000°f.



MET-O-SEAL was developed by the Franklin C. Wolfe Company to provide a practical answer to *no-leakage* sealing at extreme temperatures. Here are just some of the advantages obtainable:

- Lower machining costs
- Less flange weight
- Can not blow out
- No loss of structural strength
- No leakage!

If you design in these temperature ranges why not find out about MET-O-SEAL, one of the proven members of the Gask-O-Seal Family?

New literature NOW available upon request. Write For Free Copy.

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FRANKLIN C. WOLFE CO.

Culver City, California

"sealing design specialist"

A DIVISION OF Parker Hannifin CORPORATION
creative leader in fluid systems

Check 5018 opposite last page

"WHO...*us in the fertilizer business?*"

"Why of course gentlemen. It is the fastest growing industry in America. Other profit-minded businessmen have gone into the production of complex fertilizer because of the rapid pay-out time on plants of this type. These plants are now turning out thousands of tons of this new fertilizer, both in this country and abroad, for a constantly increasing and permanent market. Only once in the past 40 years (1930-32) has consumption of commercial plant foods declined or held stable for more than a one year period. Only once in 18 years has the consumption of primary nutrients failed to increase. This persistency to increase, which economists call a long-term upward trend, is particularly striking in the fertilizer market. C & I will design and construct complete complex fertilizer plants capable of producing any desired tonnage. New economic frontiers do not remain undeveloped for long, and now is the time to consider complex fertilizer as an investment in an industry that has shown phenomenal growth since its inception. Discuss your project with C & I—who can offer you complete marketing, distribution data, and the benefit of their outstanding experience in this particular field. For more information on this new type of plant food, send for the illustrated brochure on Complex Fertilizer."

THE CHEMICAL AND INDUSTRIAL CORP.
CINCINNATI 26, OHIO
Designers and Constructors of Plants for the Processing of Ammonia • Available throughout the World

NITRIC ACID • PHOSPHORIC ACID • AMMONIUM NITRATE • AMMONIUM PHOSPHATE • COMPLEX FERTILIZER

Check 5019 opposite last page

THAT'S INTERESTING

More pre-fabs

Pre-fab brick house has been successfully built at Geneva, Ill., by Structural Clay Products Research Foundation. A crew of five put up its total 1200 sq ft of panels in 8½ hr.

Each panel consisted of 36 bricks. Panels are bolted in top and bottom to angle irons, without mortar; roof trusses are installed; vertical joints mortared, and interiors then finished.

Clean up

Melted deposits of nylon or any other synthetic which stick to sole plate of iron or other hot surface can be easily removed. A paste of glycerine and scouring powder is applied while the surface is hot. Deposit is then removed with a soft damp cloth.

Quick time

Timing device that measures time intervals as short as a billionth of a second has been developed by Eldorado Electronics Co., of Berkeley, Calif. This is time it takes light to travel about three feet.

House of Grace

From page 33

and Almy Overseas Division makes sealing compounds and Cryovac in overseas plants, and handles the export business of its US counterpart. Grace Research and Development Division, at its spanking new Washington Research Center halfway between Washington and Baltimore, does the basic research for all seven divisions and handles research projects not within the scope of the operating companies.

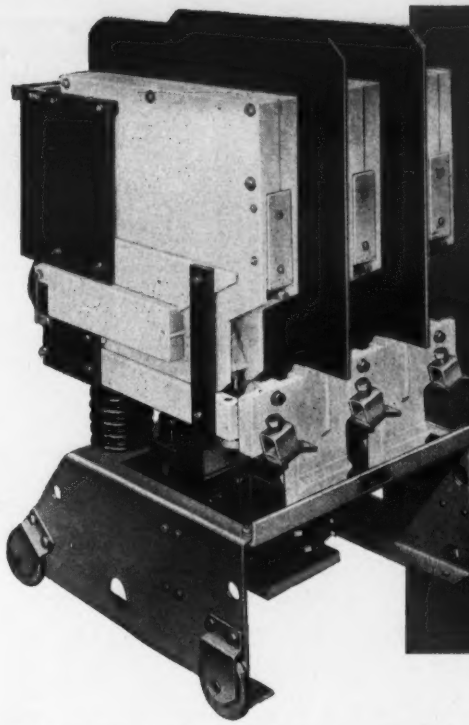
But perhaps the division which may contribute the most to Grace's immediate future is Polymer Chemicals Company. The newest addition to the group, Polymer takes Grace into the highly competitive polyethylene business. Yet this area is where management feels that most growth potential exists, and they have a multi-million-dollar high-density polyethylene plant on stream in Baton Rouge, Louisiana, with a capacity of 50,000,000 pounds a year.

Tomorrow

The future directions as announced by Grace are: 1) domestic and Latin American chemicals; 2) Latin American paper; 3) shipping between the Americas. Company sales have skyrocketed from about $40,000,000 just ten years ago to about $460,000,000 in 1957. And the rule of thumb around the company is that sales must double in five years in order to keep pace with competition. Where will these sales come from?

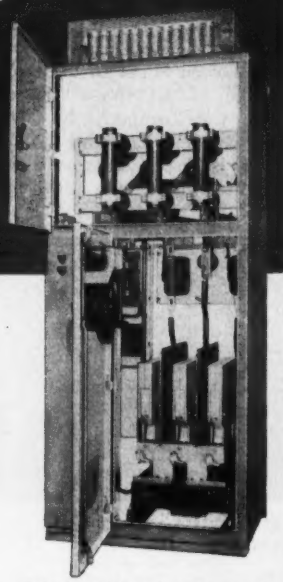
The people in research and development . . . and they should know . . . feel that the major push in the future will be in the field of polymers. One of the management group at Polymer said thoughtfully, "There are certain obvious directions we'll take . . . polymers, perhaps new plastics, certainly other developments in other companies. But I wouldn't be surprised if we show up in a different field . . . as long as it can be justified in the present corporate structure."

But whatever business the



Air break starters
for high voltage motors

A-B QUALITY



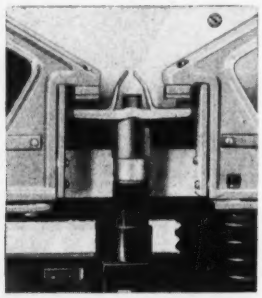
This *new* air break contactor—around which Allen-Bradley has developed a complete line of high voltage starters—is designed to match your *toughest* applications. It features the same solenoid design—with only *one* moving part—that has made Allen-Bradley low voltage starters universally recognized for their tremendous operating life.

These new contactors are available in full voltage and reduced voltage starters—nonreversing or reversing—for squirrel cage, part winding, slip ring, and synchronous motors up to 1500 hp, 2300 volts; 2500 hp, 4600 volts. All starters are equipped with current limiting fuses and have an interrupting capacity of 150,000 kva at 2300 volts and 250,000 kva at 4600 volts.

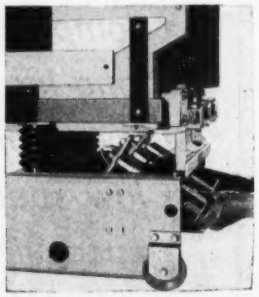
It will pay you to investigate these *quality* starters. Complete information is contained in Publication 6080 . . . please send for your copy, today.

Bulletin 966 high voltage air break, across-the-line synchronous motor starter in NEMA Type 1 enclosure.

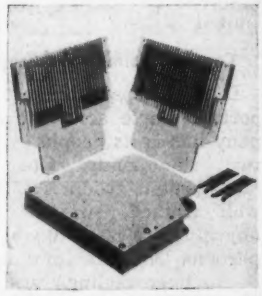
Only One Moving Part. Simple solenoid design eliminates trouble-causing pins, pivots, and flexible jumpers.



Double Break Contacts of silver alloy never need maintenance. Vertical motion assures uniform contact pressures.



Easy Access from Front. Crossbar and contacts removable from front, without special tools, for easy inspection.



Faster Arc Suppression. New blowout design and novel arc chute. Chutes are molded from an arc resistant material.

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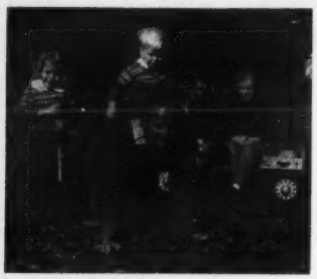
ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

Check 5020 opposite last page

company gets into next, the future of Grace is pretty well assured for two important reasons. First, its diversified markets cover the chemical industry itself as well as transportation, the food business, agriculture generally, and a considerable segment of industry. Also, a great deal of the company business is in South America, which is growing faster in population and gross national product than the United States. And Peter Grace is set to take advantage of all these factors. While the company has invested something over $150,000,000 in fixed assets over the last four years, the 1958 investment should be on the order of 60 or $70 million. (Grace now ranks ninth among chemical makers in the United States.)

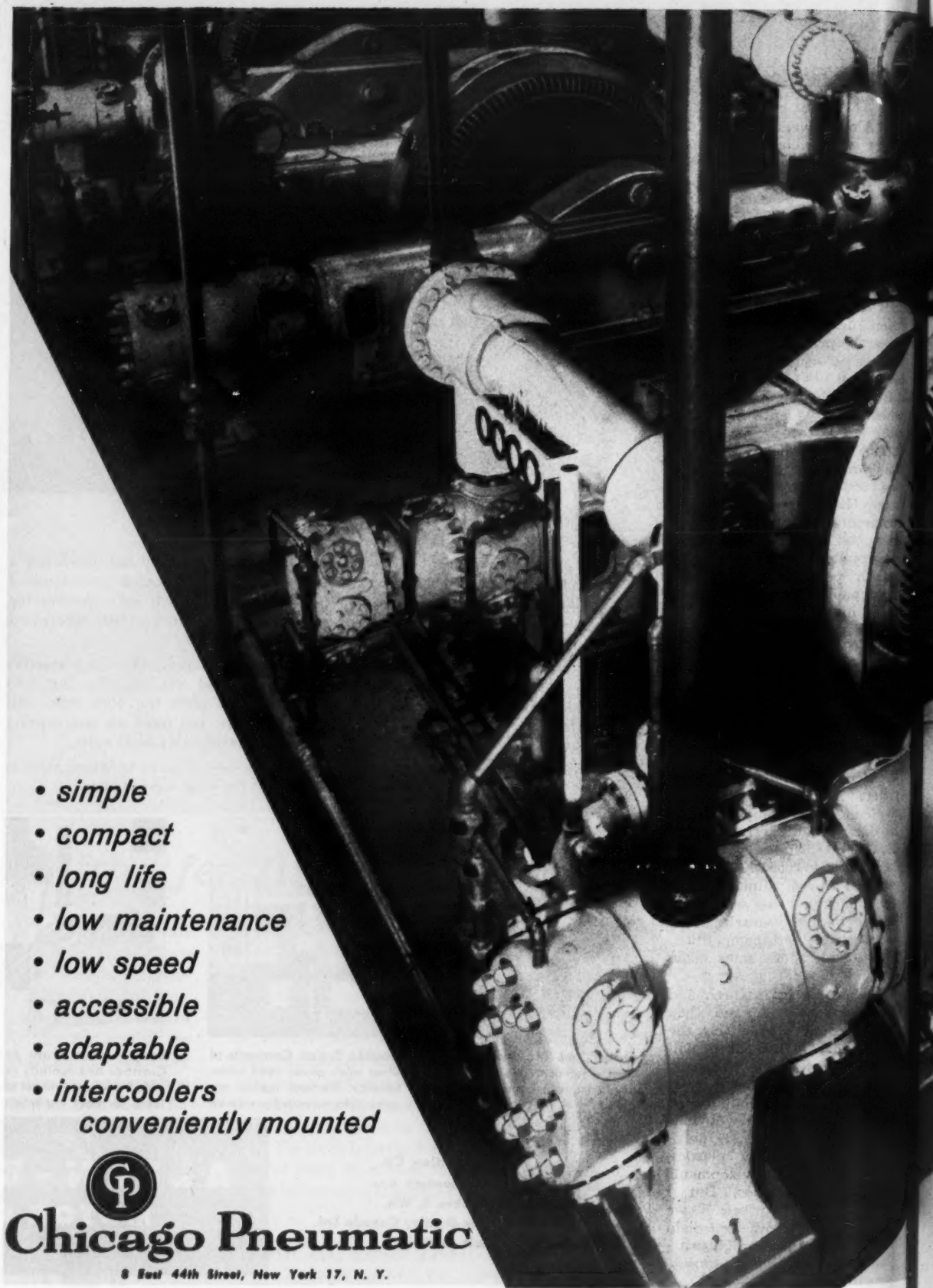


Half of Peter's household: His eight youngsters occupy the bulk of his free time at home

Capable, Enthusiastic People

But perhaps the most important single asset the company has is its people — from two standpoints. One, the management group is capable, well trained, sure of their objectives. Yet of equal importance is their enthusiasm . . . a team feeling, rare even for the chemical industry. And the main spark for that continued enthusiasm is dynamic J. Peter Grace himself.

If Horatio Alger, whose sympathies tended toward the poor-boy-made-good, had known Peter Grace Jr., the rich-boy-made-good, American literature might have had a new kind of hero. But even without Alger's inspiration, it's a sure bet that Peter has "made good" by all of the standards.



Class H-CE five-stage compressors,
two of several on the line 24 hours a day.
Four-stage Class H
compressors meet
air liquefaction demands
in a steel plant.

• FOR PRESSURES TO 15,000 PSIG

• SIZES 200 to 2000 HP
(other CP Compressor models available in sizes up to 5000 hp)

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COMPRESSORS

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 5021 opposite last page

Education: Urey

From page 45

not high enough. It is much easier for a person to do something for the retarded child than to help the gifted one. The gifted child will give you a "real race for your money." This is tiring, unless a teacher can keep up with him. It's very difficult for any but gifted people to teach gifted children. One reason why the gifted child is neglected in the United States is that he doesn't have many gifted teachers.

Teacher Colleges

I believe that the teacher colleges of the United States have ruined their own profession. They have aimed at the Average Student, almost bordering on the moronic. Now who in the teaching profession wants to spend all his time teaching at this level? The more intelligent people wish to teach the more gifted. If all teaching is aimed at the Average Student, only average people will wish to teach. So the profession has automatically eliminated the more intelligent people who might be attracted into it.

Teachers are accepting this concept of an Average Student education and are not interested in the gifted child. They do not require enough from him. The general average now goes down. The children

"Pardon the entrance, Sam . . . the elevators were crowded!"

completely corrosion-proof

- **Chemically inert from end to end** — non-contaminating and universally useful
- **Flanged ends** — liner covers full gasket face for continuous protection
- **Unaffected by corrosive fluids** — special compound of Teflon developed for maximum life

Here's a hose exclusive on two counts. (1) It has *flanged ends* – the first fluorocarbon hose to have them. (2) It has the patented Fluoroflex®-T tube.

Tube extends to cover the full gasket face of the flange, forming a continuous and integral assembly of hose and flanges. Fluid cannot contact metal. Eliminates need for costly alloy fittings.

Cleaning problems are simplified, too. The smooth, continuous bore prevents entrapment of materials.

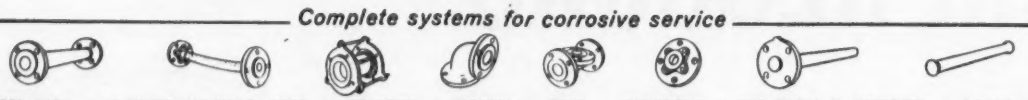
A special, high-density, non-porous compound of virgin Teflon, Fluoroflex-T is completely inert to virtually all known chemical and corrosive solutions, solvents and gases to 500° F. Write for data.

RESISTOFLEX CORPORATION, Roseland, N.J.
Other Plants: Burbank, Calif.; Dallas, Tex.

® Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.
® Teflon is DuPont's trademark for TFE fluorocarbon resins

RESISTOFLEX

Complete systems for corrosive service



LINED STEEL PIPE • FLANGED FLEXIBLE HOSE • BELLOWS • ELBOWS • TEES • REDUCERS • DIP PIPES & SPARGERS • LAMINATED PIPE

Check 5022 opposite last page

Education: Urey

From preceding page

become less well-adjusted and are disorderly. This attracts still poorer teachers.

In education, the teacher should always endeavor to inspire a student to do more than he thinks he is capable of doing. Instead of adjusting to those "slower" than himself, thus doing less than he is capable, the student should do more. The lack of this is a fundamental difficulty in our present education.

Schools and Immigrants

Q: It has been said that the American school system was developed to teach the immigrant about the United States, and this is one of the causes for the present status of education. With immigration practically stopped, is this still a factor?

A: I believe that in the country schools of Indiana, which only ran for seven months a year, I received a more serious education, 50 years ago, than children receive in the City of Chicago today. I was taught better mathematics, better grammar, better history, better fundamental subjects than they are taught today. It isn't a matter of immigrants or anything else. It is simply a steady deterioration of our attitude toward education during the last 50 years.

Parents and 'Democratic' Education

Q: Is it the parents' fault in any way?

A: It's probably a combination of faults. The attitude of the educator and the teachers' college is that he is teaching Mr. Average Student, with no attention to the superior one. It is caused by pressure from parents that their son, Johnny, who doesn't have a very high IQ, be treated in a democratic way, as compared to Billy, who does have a high IQ. Parents interpret this to mean that, by Jove, they're going to go through school together. Now, this doesn't do Johnny any good, and it certainly doesn't do Billy any good.

It is a real disadvantage to a group of children to sit in a

class with some bright ones who always know the answers to difficult questions. It is very discouraging for a child never to excel in his group. Very discouraging. If some bright fellow is always around to give the correct answer ahead of you, by and by your spirits and your courage sink. It is much better to compete with those of your own capacity. The child develops much better that way.

Q: What about the high school students' misunderstanding about the role of the scientist in the United States today? Is American science losing talented individuals to the extent that their loss is really felt because of this attitude?

A: Yes, I think so. But if you ask me for statistics to prove this, I cannot produce any.

Fostering Creativity

Q: Speaking as an educator, what is necessary to foster creativity? That's what we're looking for as a nation.

A: Well, I think most of the people with a little spark of genius are born that way. There are very few with real genius, but many people have at least a little spark of it. This can be destroyed by teachers and parents, but it probably cannot be created. Parents and teachers must look for it and try to foster it. Parents can help their children with access to many things.

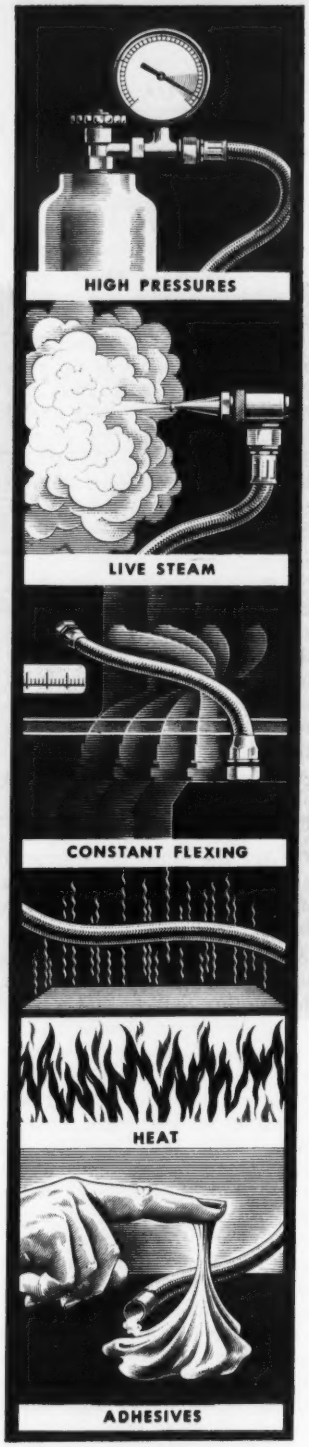
Q: This is a long, gradual process?

A: Yes. It's a matter of appreciating the interest of the child in all sorts of things and understanding his juvenile character at certain times. It's very difficult to lay down a rule for this.

American and Russian Science

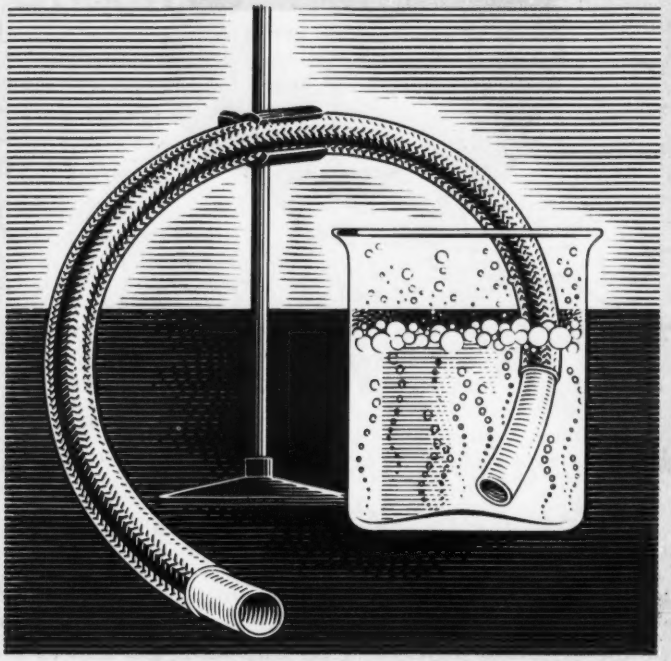
Q: What are the "pluses" of American science as compared with Russian science?

A: Most people acquainted with Russian scientific literature are convinced that in the USSR there are some very intelligent and imaginative people. They are making enormous progress. But at the present time the state of



DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Is your problem corrosive chemicals?



Save maintenance and replacement costs with hose of TEFLON® TFE-fluorocarbon resins

If your hose lines are cracking up under the strain of tough processing conditions, there's a solution in hose made of TEFLON* TFE-fluorocarbon resin. This hose is totally inert to virtually every chemical in the book. It is rated for continuous use up to 500°F. and can be made to withstand 3000 psi. It will handle superheated steam without failure, yet it is useful even in liquid oxygen service. Hose of TFE resin is extremely tough and long-lasting.

Hose with this sort of durability in chemical and petrochemical applications is bound to save you time, trouble and money. Why not ask your dealer about hose of TFE resins?—or write to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Room 95, Du Pont Building, Wilmington 98, Delaware.

In Canada: Du Pont Company of Canada (1956) Limited, P.O. Box 660, Montreal.

*TEFLON *is Du Pont's registered trademark for its fluorocarbon resins, including the TFE (tetrafluoroethylene) resins discussed herein.*

Check 5023 opposite last page

M&T TIN TETRACHLORIDE

...silent salesman for repeat business

A cake of soap. . .delicately scented, subtly tinted, beautifully packaged and forcefully advertised to sell her on *one* brand. Will she buy it again?

Keeping her sold is often a job for an unseen chemical such as M & T Tin Tetrachloride—the scent and color stabilizer specified by leading soap manufacturers. To assure the quality that means repetitive business in other fields, M&T Tin Tetrachloride is also used as a chemical intermediate; for electroconductive coatings on glass, ceramics and mica; and in silk weighting. Other possible uses are in the refining of mineral oils and as a catalyst.

AVAILABLE AS LIQUID OR SOLID

Anhydrous M&T Tin Tetrachloride is a colorless liquid, miscible with water and a number of organic solvents. Also available is a white solid hydrate, M&T Tin Tetrachloride Pentahydrate. Both are exceptionally pure. Our technical staff will be glad to cooperate in applying either, or any other M & T chemicals to current or new uses.

GET DATA ON THE COMPLETE M & T CHEMICAL LINE

Metal & Thermit offers a wide line of commercial chemicals for further research or direct application. For more information consult our insert in Chemical Materials Catalog, or write us for a copy of booklet C-57.

METAL & THERMIT CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

METAL & THERMIT — UNITED CHROMIUM OF CANADA, LIMITED REXDALE, ONT.

INORGANIC TIN CHEMICALS · ZIRCONIUM CHEMICALS · METALS & ALLOYS
ORGANOTIN CHEMICALS · ANTIMONY CHEMICALS · MINERALS & ORES
ORGANOMETALLIC CHEMICALS · PLATING CHEMICALS & PROCESSES

Check 5024 opposite last page

Education: Urey

From preceding page

American science generally is ahead of that of Russian. I believe the Russian scientists know this too. They are making enormous efforts to catch up with us, and they are succeeding to a certain extent at least.

I'm not one of those who believe that, because Sputnik got above the earth first, the Russians are necessarily ahead of us in all branches of science. I think this is not so. But also it does show a very considerable capacity in one field. We should not underestimate them in any way.

Q: Russia always has had an imaginative and creative group in the sciences. With this long history in the sciences, isn't there a tradition of "good" work in Russia, contrary to what many people think?

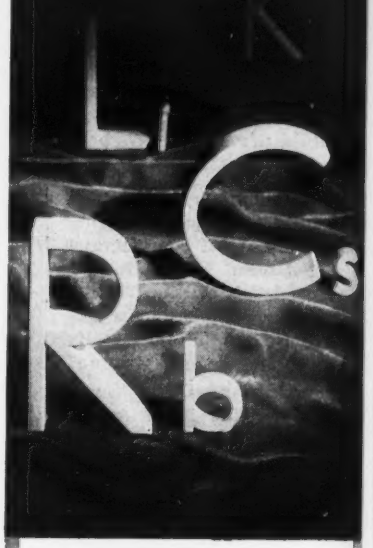
A: Yes, there is. In small amounts. But of high quality. Of very high quality.

Q: Are the needs of American science such that they can only be solved on a long-term basis?

A: The needs of American science are long-term ones. I just do not believe that a little scholarship program of a billion dollars over four years is any answer to it at all. This assumes we have adequate training in our high schools, with only the necessity of convincing some misguided boys that they should study the sciences instead of business or the humanities, or literature, or art. This is not the problem. The problem is that none of these people are receiving adequate training in our high schools. This is a much bigger problem, much more fundamental and much more expensive than the present scheme for a few scholarships. It needs more imaginative thinking throughout.

As I said, my estimate is that we should double the amount of money we spend on our schools. But just doubling the budget doesn't solve the problem. We must give our children a different kind of education.

new perspectives in alkali metal salts



Now! RUBIDIUM and CESIUM SALTS available for evaluation

American Potash & Chemical Corporation—basic in the salts of all five alkali metals—now offers Rubidium and Cesium salts at substantially reduced prices. Immediate availability of these interesting compounds . . . most highly reactive of the alkali metals . . . permits their evaluation for wider industrial use. We offer the following compounds for your consideration:

RUBIDIUM:	Carbonate (Rb_2CO_3); Sulphate (Rb_2SO_4); Chloride (RbCl); Fluoride (RbF).
CESIUM:	Carbonate (Cs_2CO_3); Sulphate (Cs_2SO_4); Chloride (CsCl); Fluoride (CsF).

TRONA* *For further information call your nearest Trona* representative, or write*

MARKET DEVELOPMENT DEPT.

American Potash & Chemical Corporation

3030 West Sixth Street, Los Angeles 54, Calif. DUnkirk 2-8231 | 99 Park Avenue, New York 16, N.Y. OXford 7-0544

*TRADEMARK AP&CC

Check 5025 opposite last page

Polyurethane Series for Chemical- and Solvent-resistant Protective Coatings

PROPERTIES OF SPENKEL POLYURETHANE SERIES

Solvent	F77-50X[1] xylol	P93-80X xylol	P18-50X xylol	P23-75S ethyl acetate	XP-1079 toluene
Non-volatile (%)	50	80	50	75	90
Acid value	1.0	1.5	1.2	1.8	0.9
Viscosity (G-H)	B	V	A	Y	200 poise
Color (Gardner)	5	2	2	2	translucent
Free Isocyanate (% on solids)	0.0	7.7	7.9	19.5	8.20
Catalyst	0.01% cobalt	2% C87-100[2]	2% C87-100	Castor 1066[3]	2% C87-100
Pot life (after adding catalyst)	>1 year	1-30 days	1-30 days	1-3 days	1 day
Dry time (hours at 77° F temp.)	4	4	2	6	1
PROPERTIES OF DRY FILMS					
Sward hardness (after 1 week)	20	12	45	48	30
Resistance (using 7-day spot test on 3-mil film)					
Alkali	F	E	E	E	E
Mineral acid	E	E	E	E	E
Oxidizing acid	G	F-G	G	G	G
Aliphatics	E	G	G	E	E
Aromatics	P	P	F	F	G
Abrasion resistance	G-E	E	F-G	G-E	E
Weather-Ometer durability of films on					
Wood	E	E	F-G	F-G	G
Metal	G	E	G	G	G
Flexibility of films	F-G	E	G	F-G	E
Ease of pigmentation	E	P-F	P	E	P

E — Excellent G — Good F — Fair P — Poor

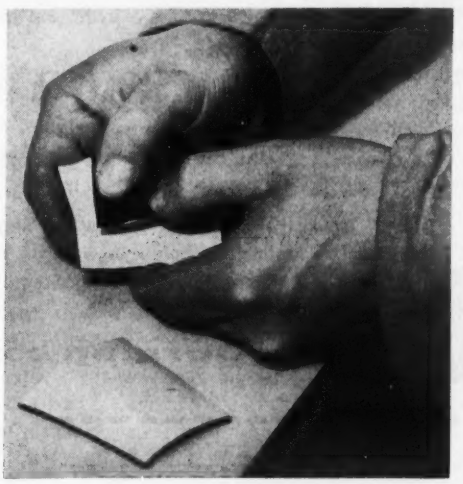
[1]Film properties are similar from the 60%-solids vehicle in mineral spirits
[2]C87-100 is a tertiary amine catalyst available from Spencer Kellogg
[3]Castor 1066 is a modified castor oil with hydroxyl number of 275

A RECENTLY introduced series of polyurethane materials offers vehicles for high-quality marine and floor finishes, clear exterior varnishes, masonry coatings, and industrial primers and enamels.

Called Spenkels, products are formed by reacting various isocyanates with castor oil, polyesters, hydroxylated drying oils, or other materials containing hydroxyl groups.

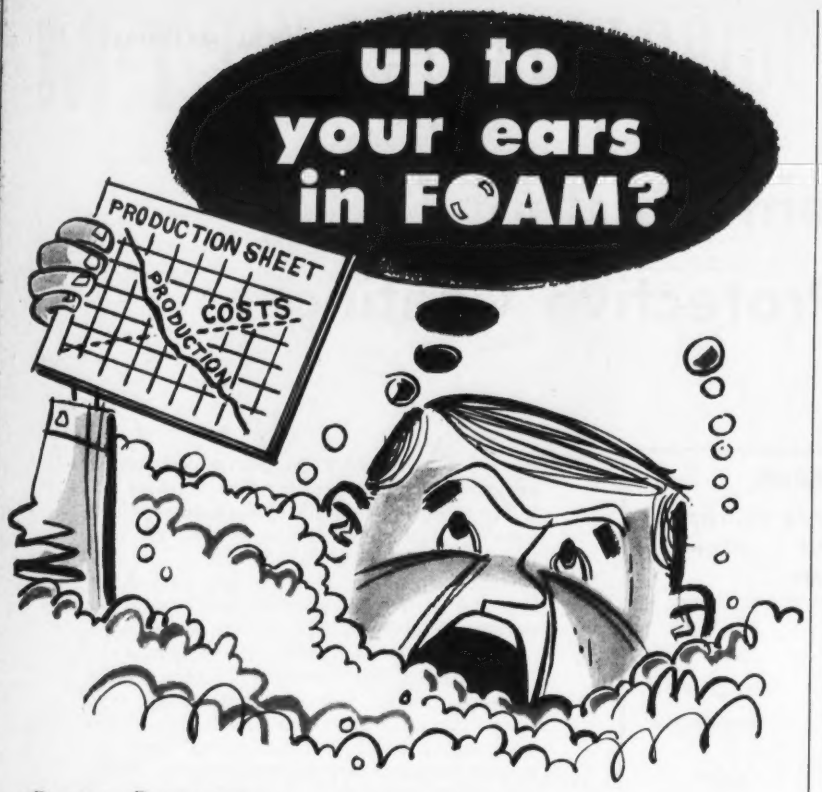
Members of the Spenkel F77 series yield one-can, stable, fast-drying coatings systems. As high-gloss varnishes, they have outstanding weathering properties. They also can be pigmented by conventional methods. Paint films have superior water resistance and are resistant to abrasion, which makes them attractive industrial finishes.

Spenkel F77-50X is furnished at 50% solids in fast evaporating xylene for spraying formulations. Spenkel F77-60MS is a brushing vehicle at 60% solids in mineral spirits.



Coatings are very flexible. Film doesn't crack even when pieces of coated rubber are bent

The other products (identified by the prefix "P"; e.g., Spenkel P93-80X) are prepolymers and possess unreacted isocyanate groups. They are two-can systems and must be mixed with polyols and/or catalysts just before use. The prepolymers tie up the iso-



then change to a Dow Corning SILICONE DEFOAMER

1 OUNCE KILLS FOAM IN:

250,000 lb
molasses, vat dye solution, trioxide pickling solution, tall oil

125,000 lb
phenolformaldehyde, urea formaldehyde, asphalt, starch sizing

62,500 lb
soft drinks, 70% caustic liquor, black liquor, sulfuric acid pickling bath

FREE SAMPLE

Make your own test of Dow Corning SILICONE DEFOAMERS. Use the coupon below or write on your letterhead to receive a free trial sample. No obligation, of course.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

325

NAME _____

TITLE _____

COMPANY _____

CITY _____ ZONE _____ STATE _____

My foamer is

Oil system _____

Aqueous system _____

Food products _____

Other _____

Check 5026 opposite last page

cyanate component in partially reacted non-volatile form, and minimize the toxic hazards in working with these unusual chemicals.

As coatings, the prepolymer films are characterized by high resistance to attack by specific solvents and corrosive chemicals. The films have strong adhesion, high impact strength, and abrasion resistance. They are available in a wide range of hardness and flexibility.

Some prepolymers are provided at 100% solids for use in foams, encapsulation and potting applications.

An experimental adhesive, currently coded XP-1079 has an attractive combination of properties: high shock resistance, chemical inertness, and excellent adhesion to a wide variety of surfaces, including copper and brass.

(Polyurethanes are products of Spencer Kellogg and Sons, Inc., PO Box 989, Buffalo 5, New York.)

Check 5027 opposite last page.

PVC resin series bul

Brief description, typical analysis, and graphic picture of physical properties of each member of company's PVC resin series is contained in 52-page bulletin. General information, basic formulations, and various test methods are included. Form 4716 — Chemical Div., The General Tire & Rubber Co., 1708 Englewood, Akron 16, Ohio.

Check 5028 opposite last page.

Galaxy of uses foreseen for selectively reactive diepoxides

Uses: In epoxy and other resin systems where they can function as diluents, cross-linking agents, or modifiers of resin properties. Other applications are intermediates for perfumeries, cosmetics, pharmaceuticals, adhesives, lubricants and lubricant additives, and in organic synthesis.

Features: Chemicals combine the reactivity of the

THE LEGENDARY FIREBIRD, the Phoenix, rose young and strong again and again from flames . . . This is the Norton Firebird — symbol for the exciting new fused materials made in Norton's electric furnaces.

electrochemicals
. . . gifts of the firebird

New booklet on
ZIRCONIUM
compounds
and other
electrochemicals

Born in flames, like the legendary Phoenix, Norton electrochemicals gain new power to perform new wonders. Zirconium compounds, formed at terrific heat in Norton electric furnaces, are being supplied to industry as oxides, carbides, borides and nitrides, as well as calcium zirconate.

These Norton compounds of zirconium offer many possibilities for new applications — as source materials, metallurgical additives, cermet components, electrical conductors, and refractories.

So do many other Norton electrochemical developments, which may prove to be vital to your own processing. This new booklet brings you valuable data. Write for it to NORTON COMPANY, Electro-Chemical Division, 884 New Bond Street, Worcester 6, Mass.

NORTON
ELECTROCHEMICALS

GIFTS OF THE FIREBIRD: compounds of silicon zirconium • boron • aluminum • magnesium titanium • chromium . . . including many borides carbides • nitrides • oxides.

MAKING BETTER PRODUCTS
...TO MAKE
YOUR PRODUCTS BETTER

Check 5029 opposite last page

epoxy group with their difunctional nature. The epoxy group may be polymerized, isomerized, reduced, or ring-opened with active hydrogen compounds.

Description: Dimonene dioxide, a colorless liquid boiling at 82°C at 2 mm (Hg), has a flash point of 118°C (Coc). It is slightly soluble in water and miscible with most organics. The two epoxy groups of limonene dioxide possess different reactivities: the internal one is more susceptible to acid-catalyzed ring-opening, and the external one to base-catalyzed reaction.

Dicyclopentadiene dioxide is a white crystalline solid of over 95% purity. Melting point is 184°C. It is insoluble in water and pentane, slightly soluble in hexane, and very soluble in most other organic solvents. Its solubility in epoxides presents the possibility of combining the reactivity of the two epoxides in a single ("tailored") mixture.

The epoxy group on the unbridged (five-membered) ring reacts normally with hydrogen halides in acetic acid solvent. The other epoxy group reacts preferentially with the acetic acid to form the hydroxy-acetate rather than with the hydrogen bromide to form the bromohydrin. This abnormal and unique reaction presents interesting possibilities.

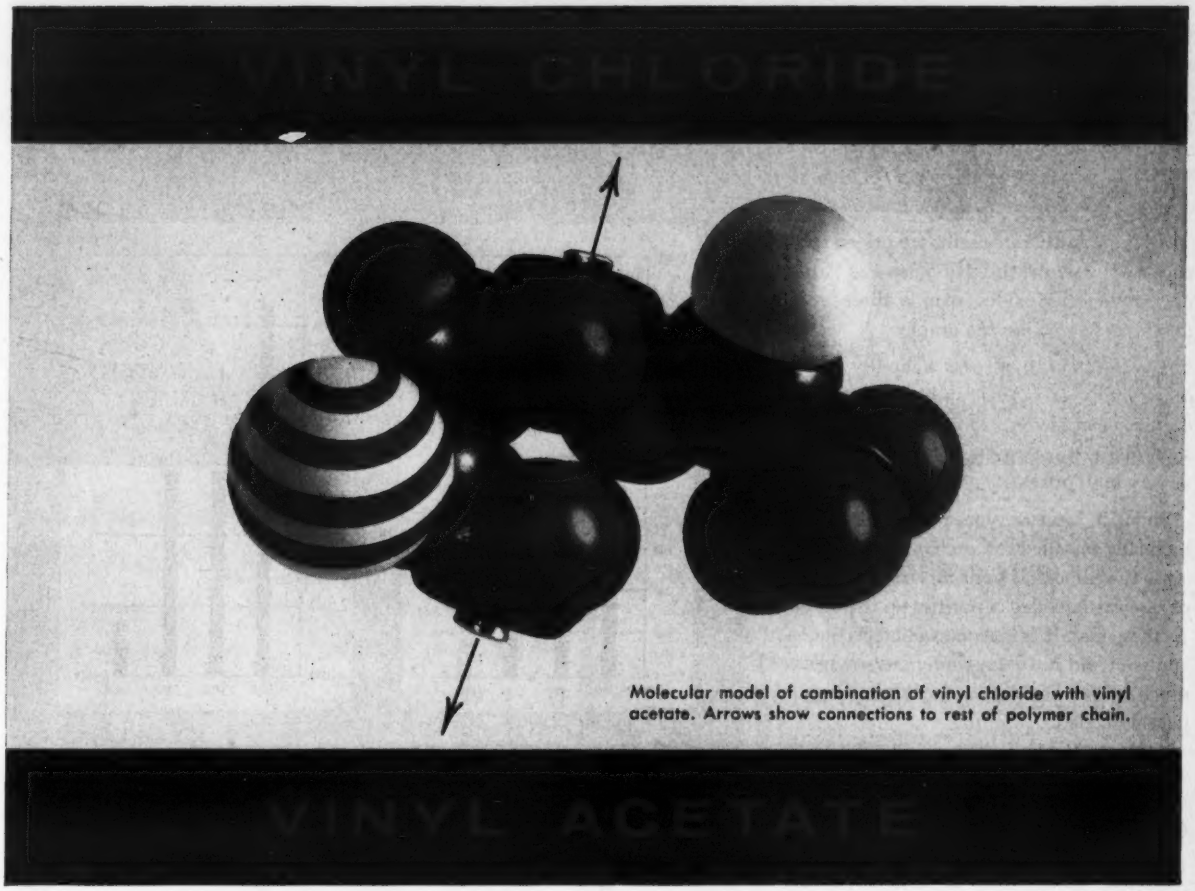
(Diepoxides are available from Becco Chemical Div., Food Machinery and Chemical Corp., Station B, Buffalo 7, New York.)

Check 5030 opposite last page.

Rare earth abstracts

Abstracts survey ten years of literature, here and abroad, on the metallurgical applications, both ferrous and nonferrous, of the rare earths. To obtain "Metallurgical Applications of the Rare Earths", a 46-page publication, submit request to Box 488-D, Davison Chemical Company, Division of W. R. Grace & Company, Baltimore 3, Maryland.

NOW COMBINED
in emulsion form



Molecular model of combination of vinyl chloride with vinyl acetate. Arrows show connections to rest of polymer chain.

Another National first! This time: an emulsion copolymer of vinyl chloride and vinyl acetate. Its name: RESYN® 2507.

RESYN 2507 is a striking new adhesive-binder that combines the properties of polyvinyl acetate with polyvinyl chloride. It heat seals at low temperatures. It wet bonds a wide range of materials that include vinyl sheeting and synthetic fibers.

RESYN 2507 is amazingly simple to formulate. Its viscosity is reasonably high—like a polyvinyl acetate emulsion. Thickening is unnecessary. Many plasticizers can be stirred in without pre-emulsification. Other outstanding characteristics: Good wet tack. Exceptional mechanical stability. Superior holdout on porous surfaces. Borax compatibility.

RESYN 2507 shows promise for fire retardant coatings and nonwoven textiles in addition to its many adhesive applications. Additional information will be sent on request.

RESIN DIVISION

National

STARCH PRODUCTS INC.

750 Third Avenue, New York 17 • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

Check 5031 opposite last page

A REVOLUTION IN RARE EARTHS

Costs down sharply... large quantities available

a report by LINDSAY

Today you can buy at $50 per pound Samarium Oxide of 99% purity which in 1955 cost $1825—a price reduction of 97%, almost unprecedented in the chemical industry.

All high purity rare earths are priced substantially below the 1955 levels. Price ranges for four oxides, over a three-year period, are shown in the graphs.

During 1954, there was a rapidly developing industrial interest in high purity rare earths which were available then only in small, laboratory-production quantities and at very high prices.

In 1955, Lindsay pioneered the first commercially installed ion exchange pilot plant with 40 six-inch columns for the production of rare earth oxides in purities up to 99.99%. As these materials became available, the response from industry demonstrated that much larger production facilities were urgently needed.

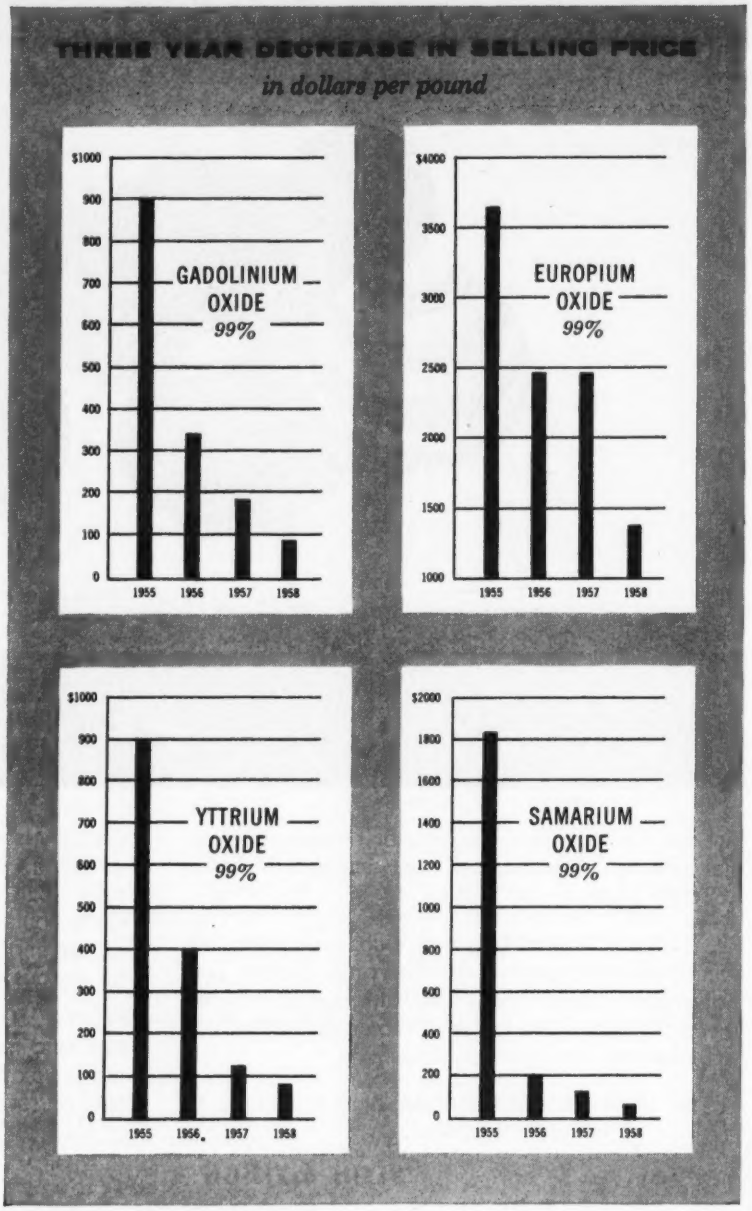
LINDSAY EXPANDED PRODUCTION

Consequently Lindsay immediately expanded its ion exchange plant and is now operating continuously more than 100 columns with large production units of eighteen-inch and sixty-inch diameters.

With large volume production, we can now make prompt shipments of high purity materials in quantities from a gram to hundreds of pounds.

Current prices make high purity rare earths extremely attractive and economically sound for a wide variety of chemical and industrial purposes.

We will be happy to supply technical data and information about availabilities, prices and industrial applications.



PLEASE ADDRESS INQUIRIES TO:

LINDSAY CHEMICAL COMPANY

World's Largest Producer of Thorium and Rare Earth Chemicals

288 ANN STREET • WEST CHICAGO, ILLINOIS

Check 5032 opposite last page

CHEMICAL MATERIALS

Reveal new plastics, pharmaceutical uses for fluoro-organics

Improved stability in chemicals and plastics plus enhanced potency in many classes of drugs have recently been brought to light through the use of trifluoroethyl chloride and trifluoroethanol.

Specifically, these intermediates are the basis for: more stable, fire-retardant polymers of the trifluoroethoxy vinylic and acrylic types, safer and less flammable inhalation anesthetics; and dyestuffs with improved light-fastness.

Trifluoroethanol is a powerful ionizing solvent for organic materials and does not irreversibly solvate the ions formed.

(Fluoro-organics are available from Pennsalt Chemicals Corp., Three Penn Center, Philadelphia 2, Pa.)

Check 5033 opposite last page.

Antifoam, leveling agent for starches, dextrines, is widely effective

Uses: As antifoam and leveling agent for coatings and adhesives.

Features: Liquid is effective for systems based on starches and dextrines, natural proteins, and synthetics.

Description: Antifoam and leveling agent is designed to be used "as received" or in form of dilute water emulsion, depending on preference. Material can be added during mixing or milling operations, or to finished coatings. Suggested starting point is 0.1% by weight. Material can replace tri-butyl phosphate in many formulations at a substantial savings in cost.

Characteristics and properties are:

Weight per gallon (lb)	7.6
Specific Gravity (@ 25°C)	.921
Flash Point	Over 350°F

(Antifoam TBX is product of Hodag Chemical Corp., 7247 N. Central Pk., Chicago 45, Ill.)

Check 5034 opposite last page.

Bark of Douglas fir tree yields useful chemical

Has antioxidant properties, ultraviolet absorptivity

Uses: For pharmaceutical, industrial, and chemical use.

Features: Chemical has antioxidant properties. It may be used to protect certain products — rubber, plastics, petroleum, insecticides, hydraulic fluids, and vegetable and animal oils — from spoiling or deteriorating when in contact with air, or by exposure to ultraviolet light.

Description: Quercetin is processed to a high degree of purity. Formerly derived from imported raw materials, manufacturer has developed process of extracting quercetin in pure form from the bark of Douglas fir trees. Availability: pilot-scale quantities.

(Quercetin is available from Weyerhaeuser Timber Company, Tacoma 1, Wash.)

Check 5035 opposite last page.

Anti-bacterial compound non-toxic, safe, non-irritating

Uses: As anti-bacterial compound for use in soaps, cosmetics, and toilet goods.

Features: Compound is easy to formulate and compatible with most industrial and pharmaceutical products. Its lack of toxicity and non-irritating action on wounds and unbroken skin fully establish its safety.

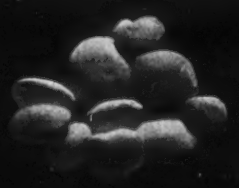
Description: Anti-bacterial compound is odorless, tasteless, non-corrosive, and water soluble. This complex silver compound has been tested against a broad spectrum of Gram-positive and Gram-negative bacteria.

The silver is strongly bound and is not in colloidal form. It has an extremely low ionization constant and acts oligodynamically.

(Agosan-H-6 is product of Ions Exchange & Chemical Corp., 40-50 Leonard St., New York 13, N.Y.)

Check 5036 opposite last page.

You can improve operating efficiencies, cut costs, increase product quality with...



International High Purity

99.0+% MAGNESIUM OXIDE

chemical specifications

chemical		purity range
MAGNESIUM OXIDE	MgO	99.40 – 99.70%
IRON	Fe_2O_3	0.03 – 0.06
LIME	CaO	0.07 – 0.08
ACID INSOL.*		0.02 – 0.10
OXIDES**	R_2O_3	0.04 – 0.09
BORON	B_2O_3	0.0025 – 0.015
CHLORIDE	Cl	0.02 – 0.08
SULFATE	SO_4	0.02 – 0.09
SODIUM AND POTASSIUM	Na+K	0.02 – 0.07
LOSS ON IGNITION		Nil

*Mainly SiO_2
**Other than Fe_2O_3

INTERNATIONAL MgO HAS DEMONSTRATED ITS SUPERIORITIES FOR THESE AND OTHER USES

- *As a high purity raw material for fused refractories.*
- *As a low boron source of magnesia.*
- *As an alkali precipitant for controllable reactions.*
- *In the manufacture of high purity magnesium chemicals.*
- *For blending and upgrading with other magnesias.*
- *For high grade ceramic and glass formulations.*
- *In low sulfate, high magnesia catalysts.*

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

POTASH DIVISION ..... 20 N. Wacker Drive, Chicago 6

485 LEXINGTON AVE., NEW YORK 17 · MIDLAND, TEXAS · FULTON NATIONAL BANK BLDG., ATLANTA, GA.

physical specifications
(Color . . . White)

PELLETS:	Approx. ⅛" x ⅛", plus 12 mesh Bulk density: 60 lb. cu. ft.
GRANULAR:	90% minus 12 mesh Bulk density: 70 lb. cu. ft.
POWDERED:	100% minus 200 mesh 90% + minus 325 mesh Bulk density: 80 lb. cu. ft.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION
20 North Wacker Drive, Chicago 6

☐ Please send me samples of MgO in ..... form
(pellet – granular – powdered)

☐ Please send Magnesium Oxide Brochure
My field of interest for MgO is .....

Name .....

Firm .....

Address .....

City ..... State .....

Check 5037 opposite last page

Temperatures of 500°F+ withstood by phenolic molding compound

Low moisture absorption, good electrical properties

Uses: Product is being used to mold many parts formerly produced from metal or resin-impregnated glass material.

Features: Parts made from this material have been used for long periods of time at 500°F, and momentarily at temperatures that melt aluminum and comparable materials. Product has low moisture absorption (less than 0.4%), good electrical properties, and a good finish.

Description: Molded parts of glass-filled phenolic molding compound have an impact resistance greater than 2 ft-lb per inch of notch, compressive strength of 25,000 psi, and flexual strength of 14,000 psi.

(Alcylite PH 001 is product of Loven Chemical of California, Newhall (L. A. County) Calif.)

Check 5038 opposite last page.

Dyes paper white

Detailed 28-page brochure tells how to impart brilliant "whiter-than-white" look to regular grades of paper, by using Calcofluor white dye. "Dyeing Paper White" — Dyes Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.

Check 5039 opposite last page.

Upgrade your product by adding chemically an organo-silicone

Uses: Manufacturer of resins, dyes, waxes, oils, plasticizers, light stabilizers, heat stabilizers, pharmaceuticals, and fungicides may find in this versatile organo-functional silicone a new approach to improved products.

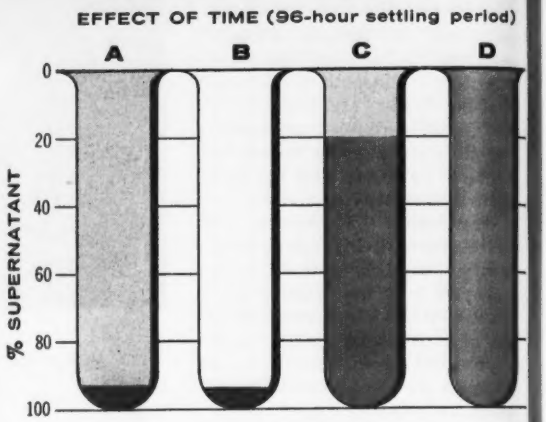
Features: The epoxy groups of this intermediate undergo the typical reactions of glycidyl ethers, making it pos-

MIN CHE ...news briefs

Improved Suspension at Minimal Cost

with new Attagel® 20

Chart and table show the anti-settling characteristics and low material costs for new Attagel 20—a colloidal grade of processed attapulgite used as an emulsifying, thickening or suspending agent in organic and aqueous systems. In this test, 100 ml. of each sample was allowed to settle for 96 hours. Ratio of Attagel 20 to surfactant in this study was 3:1—however, the optimum ratio for other pigment combinations can vary and should be determined by the individual formulator. If your products, organic or aqueous base, require emulsifying, thickening or suspending, investigate the merits of Attagel 20. Use the coupon for prompt information.



Anti-Settling Characteristics, Material Costs of Attagel 20 Formulations

Sample Number	BASIC FORMULA*						Approx. Raw Material Costs	
	Red Oxide	TiO_2	Alkyd (50% NVM)	Mineral Spirits	Attagel 20	Surfactant	$/lb.	$/gal.
A	13.50	1.50	10.00	75.00	0.00	0.00	0.070	0.54
B	13.50	1.50	10.00	73.67	1.00	0.33	0.072	0.56
C	13.50	1.50	10.00	71.67	2.50	0.83	0.076	0.60
D	13.50	1.50	10.00	68.30	5.00	1.70	0.079	0.65

**In percentages, based on total weight of sample*

Porocel—Isomerization Catalyst Carrier—

helps maximize quantity and quality of av-gas and motor fuel

Porocel, activated bauxite carrier for the $AlCl_3$ catalyst in isomerization of normal butane to isobutane, is an attractive tool for refiners in today's octane race. A low capital cost features this time-tested process. Putting $AlCl_3$ on Porocel is a simple step for the refiner, who then has a supported catalyst with rigidly controlled particle size, natural ore ruggedness, high adsorptive capacity, uniform $AlCl_3$ dispersal, inertness, low cost, and freedom from impurities—a catalyst which promotes clean-cut, smooth reactions at a high yield/catalyst ratio.

MINERALS & CHEMICAL CORPORATION OF AMERICA
Leaders in creative use of non-metallic minerals

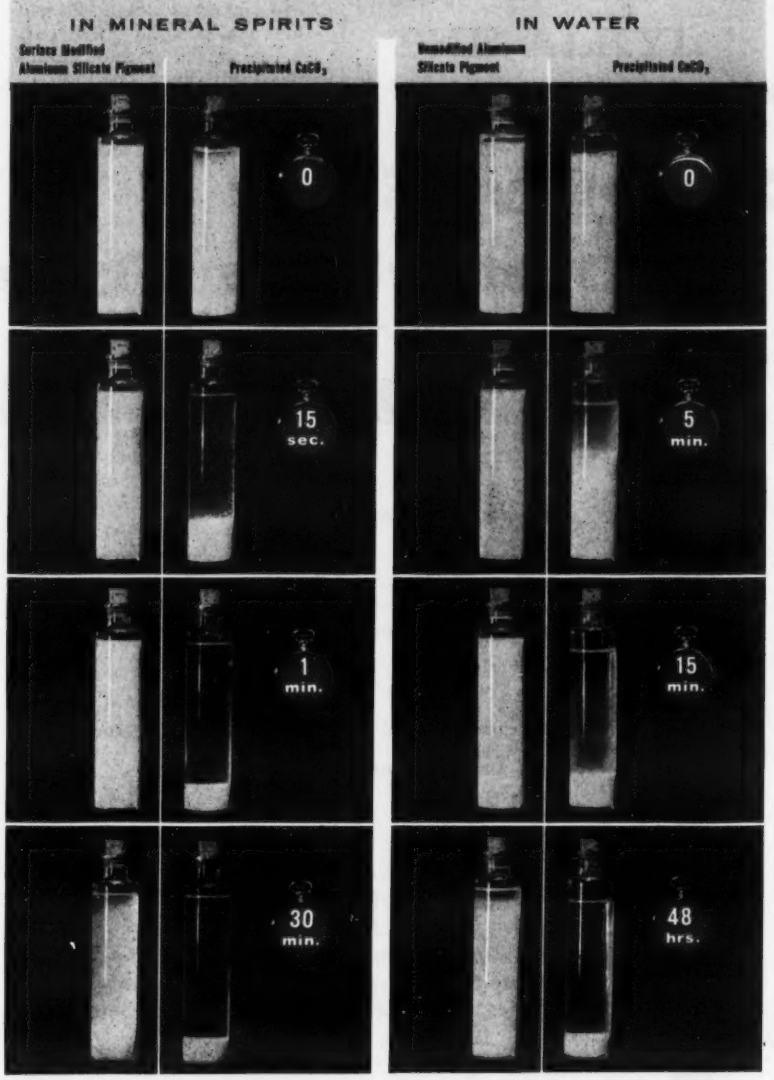
*M&C offers new organophilic aluminum silicate pigments;

Line now covers extenders and fillers for aqueous and organic systems

Aluminum silicate crystals in their natural state are hydrophilic—lovers of water, ideal for many extender and filler applications. Now, by an exclusive advancement in surface chemistry, M & C technologists have developed a new family of pigments with *reversed* surface characteristics—these new Surface Modified products are organophilic with "hydrophobic" properties—haters of water and lovers of organic solutions. The advantages of this new development for different industries are highlighted below. This is a *starred item*. Use the coupon.

Suspension tests show superiority of both types of Aluminum Silicate Pigments

Unretouched photographs of laboratory tests where equal amounts of M & C aluminum silicate pigments and precipitated $CaCO_3$ were added to test liquids, and pictures taken at different time intervals. In each case, M & C materials are substantially superior.



IN PAINTS

Formulators of organic paint systems get four striking advantages with the new organophilic Surface Modified aluminum silicate extender pigments: (1) reduced grinding time (2) superior suspension properties (3) improved water resistance (4) optimum adhesion of the film to metallic surfaces. M & C unmodified materials have always been the most widely used in latex systems.

IN PLASTICS

Reinforced plastic laminates containing Surface Modified aluminum silicate pigment fillers exhibit extremely low water absorption—meaning improved resistance to blistering and peeling. In *premix* operations, M & C fillers produce a dry, homogeneous mixture—longer pot life—excellent physical and electrical properties. And in *liquid* molding—good flow, reduced viscosity, thixotropy, high opacity.

IN PRINTING INKS

Need body, shortness, and some thixotropy? The unmodified extenders are ideal for viscous systems containing nonpolar vehicles—such as silk screen inks. Good flow, and length required? New, Surface Modified materials are best for flexographic, lithographic, heat-set and gravure inks—in polar or nonpolar media. Benefits include: excellent wetting, easy dispersion, great suspension, good press behavior, low price.

Use this quick two-check coupon ▶

✓ your product interest . . .
✓ what you need to get tests started . . .
we'll fill your requests immediately.

For more data, see Chemical Materials Catalog Pages 358-362

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☐ * Printing ink extenders; ☐ New Attagel 20;
☐ Isomerization catalyst carrier

Please send, without obligation:
☐ data; ☐ samples; ☐ prices; ☐ technical representative

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address_____
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Check 5040 opposite last page

sible to attach the silicon containing molecule to a wide variety of chemicals. These silicone modifications are hybrids, and may add useful silicone properties to the original product.

For example, when reacted with common epoxy casting resins, resulting products have improved resistance to low-temp cycling. Epoxy curing agents can be improved similarly.

When organo-silicone is used as a reactive diluent, solid epoxy resins can be made into liquid formulations suitable for casting.

Description: Organo-silicone reacts readily with active-hydrogen compounds forming substituted hydroxy alkyl siloxanes. These may be reacted further with isocyanates, anhydrides, fatty acids, and other materials to produce resins that contain stable, flexible siloxane linkages.

Chemical structure of the difunctional epoxy silicone chemical is shown by the structural formula.

Called Syl-Kem 90, product is supplied as a low-viscosity liquid of light straw to clear color. Viscosity is 10 to 12 centistokes; sp gr is 0.99 to 1.00; boiling range (95% @ 2 mm Hg) is 365 to 375°F. Hydrolyzable chloride is less than 0.001%. Solubility in common organics is complete.

(Syl-Kem 90 is a product of New Products Dept., Dow Corning Corp., Midland, Michigan.)

Check 5041 opposite last page.

Organic peroxides

Seven-page bulletin tells stabilities of dry and paste forms of benzoyl, lauroyl, and MEK peroxides. "Stability of Organic Peroxides" — Chemical Dept., McKesson & Robbins, Inc., 155 E. 44th St., New York 17, New York.

Check 5042 opposite last page.

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Dimethyl Ether of Diethylene Glycol

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Anhydrous Reaction Medium for...

Alkylation of Amines with Sodium Hydride
Self-Condensation of Esters with Sodium Hydride
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Reductions Employing Sodium Borohydride.

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Ethylene Oxide, Ethylene Glycol, Ethylene Diamine, Diethylene Glycol, Triethylene Glycol, Polyethylene Glycols (Poly-G's), Polyamines, Ethanolamines, Dichloroethylether, Ethylene Dichloride, Surfactants (Poly-Tergents), Glycol Ether Solvents (Poly-Solv's)

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ORGANIC CHEMICALS DIVISION

5950

OLIN MATHIESON CHEMICAL CORPORATION
ONE PARK AVENUE, NEW YORK 16, NEW YORK

Check 5043 opposite last page

Tag fluorocarbon resins with common names

To simplify description of fluorocarbon resins, two new common names have been adopted as standard by the Society of Plastics Industry. The decision will affect materials marketed under the "Teflon" trademark, including fluorocarbon resins, fibers, and finishes.

In the future, "Teflon" tetrafluoroethylene resins will be identified by the common name "TFE-fluorocarbon resins." The common name for a new material recently developed, "Teflon" 100-X perfluorocarbon resin, will be altered to FEP-fluorocarbon resin. The term FEP is an abbreviation of fluorinated ethylene propylene, chemical basis of the new resin.

(Information courtesy of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.)

Storage of acrylates

Use of inhibitors, inhibitor removal, and storage and handling of acrylate monomers are in seven-page bul "Information on Inhibition and Storage for Ethyl and Methyl Acrylates" — Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.

Check 5044 opposite last page.

Protects polyethylene to ten times more effectively

A number of new additive combinations which are up to ten times as effective as presently used antioxidants in inhibiting the oxidation of polyethylene have been discovered. Certain substituted thioethers, when used in conjunction with carbon black, *gain* exceptional antioxidant activity over their use in clear polyethylene. (Conventional protectants tend to lose their effectiveness in the presence of carbon black.)

The substituted thioethers are formed by the condensation of conventional thermal

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of

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Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
Glycerine

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Check 5045 opposite last page

antioxidants, such as aromatic amines or phenols, with sulfur dichloride. Alkyl, aryl, and heterocyclic thiols and disulfides without amine or phenolic substituents are also effective antioxidants when used with polyethylene containing carbon black.

About 0.1% of the sulfur compound with 3% carbon black is highly effective in reducing both thermal and photo-oxidation. The carbon black is added to cut down photo-oxidation.

The best conventional antioxidants protect carbon black-polyethylene formulations for less than 200 hours under accelerated test conditions (140°C in oxygen).

With several of the new protectants, however, oxidation proceeds at a slow, even rate and does not become autocatalytic ("run away") even after 2000 hours at 140°C. This is equivalent to much more than 20 years of normal service life.

(Thermal antioxidants for polyethylene are development of Bell Telephone Laboratories, 463 West St., New York 14, New York.)

Check 5046 opposite last page.

Economical stabilizer for asphalt emulsions

A lignin product, called Indulin C, has been found to make a highly effective stabilizer for oil-in-water type slow settling asphalt road emulsions employing rosin and fatty acid soaps as primary emulsifiers. Product is easy to handle and use, has excellent solubility, and is low in cost.

Indulin C reacts with calcium and other soap-deactivating metals. Dispersant action prevents agglomeration of bitumen droplets suspended in the aqueous phase without affecting final emulsion viscosity. It permits a reduction in caustic and soap concentrations in the formulations.

(Indulin C® is a product of Polychemicals Div., West Virginia Pulp & Paper Co., Charleston A, S.C.)

Check 5047 opposite last page.

2

bacteriostatic, fungistatic and surface-active agents; polymer components—

THE ALKYL BORIC ACIDS

Two new organoboron compounds—Nonyl Boric Acid, $C_9H_{19}B(OH)_2$; and Dodecyl Boric Acid, $C_{12}H_{25}B(OH)_2$—are available in developmental quantities. They are very weakly acidic, oxidize about as readily as aldehydes, and are stable to hydrolysis.

Tests show interesting bacteriostatic, fungistatic, and surface-active properties. Usefulness is indicated in products requiring resistance to rot and fungal attack. Some patented uses are: as organic-inorganic polymer intermediates, as petroleum additives, and as stabilizers for aromatic amines. Write for Bulletin C-710.

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Check 5050 opposite last page

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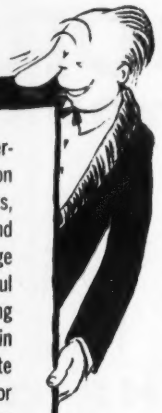

EVER hear of PuTROL®? It's a specially interesting product for folks who have putrefaction odors to contend with — like fat renderers, tanners, kennel operators, veterinarians and superintendents of zoological gardens, sewage disposal plants and city dumps. It's a powerful deodorant, particularly suited for controlling decomposition odors from decaying protein materials. And it's really low-priced, too! Write FRITZSCHE for samples of PuTROL® and for further details . . . or for assistance with any problem involving unpleasant odors now causing you concern.

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Check 5051 opposite last page

CP Staff Photos

New products and designs were highlighted at the industrial exhibit at the conference. Boat construction accounted for 25-million pounds of reinforced plastics in 1957 — 15% of the total market

What's new in reinforced plastics?

Materials, markets, methods highlighted at 1958 Reinforced Plastics Conference and Exhibition

Over 900 representatives of the multi-million dollar reinforced plastics industry gathered recently in Chicago at the 1958 Conference of the Reinforced Plastics Division of the Society of the Plastics Industry.

Engineers, designers, and businessmen — all enthusiastic about the 20% increase in industry sales during 1957 — discussed new materials, methods, and markets — ideas for increasing sales even more during 1958.

Materials

Over sixty reports were presented at the conference. One of the papers gave the latest details of a recently introduced all-acrylic resin for use in clear low-pressure laminates. (See CHEMICAL PROCESSING, March 1958, p109, for story about Lucite acrylic syrup.)

Test data were presented that showed that weatherability and gloss of these laminates were exceptionally good. "Handling characteristics," Du Pont's Mandell Ziegler said, "are similar to epoxy systems, and the acrylic syrups can be modified by diluting with methyl methacrylate monomer."

In a paper presented by Balsa Ecuador Lumber Company, Richard Mark told the reason that plastic-coated kiln-dried wood won't decay — even under extreme moisture conditions. It seems that the chemical resin of the plastic sterilizes the wood surfaces, excluding decay-causing fungi. Kiln drying of the wood kills internal organisms.

Although laminators have been using wood as a reinforcing material for many years now, there has been much controversy as to its decay resistance. This is probably the first test that actually proved decay resistance and found out the reasons why.

Methods

Ideas in quality control, processes, design, and product applications were also covered. One of the highlights was A. P. Mazzucchelli's description of metal fiber-reinforced epoxy compositions. Medium production-run metal forming has been attained using dies made of epoxies re-

Materials survey session. Mandell Ziegler gives details on Du Pont's acrylic molding syrup. Seated behind are: H. Phinney of Bakelite, T. Jordan of General Electric, and Miss A. Gitter of the firm Whittaker, Clark, and Daniels

inforced with metal or with glass fibers and metal fiber flocking.

Mazzucchelli, of Bakelite's Research Laboratories, cited an example of where 130,000 stampings of a 0.025-inch-thick brass radiator cover were made from one such die. Cost of tooling is much less than for metal dies.

Markets

Sales of reinforced plastics reached the 168-million-pound mark during 1957. Resins — with the polyesters 'way out in front — accounted for half this total, and reinforcements, fillers, and pigments accounted for the other half.

Largest market was in parts for automobiles and trucks. This amounted to 1/5 of the total. There was a four-way tie for second place: aircraft and missiles, boats, construction (flat and corrugated paneling), and consumer products (outboard motor housings, furniture, fishing rods) each took 15%.

Smaller markets — 2 to 3% of the total — were in appliances (mostly cabinets), containers and trays, electrical uses, and in pipe, tanks, and ducts. Miscellaneous uses totalled 9%.

Credit for this continuing growth has been attributed to the outstanding ability of reinforced plastics to be modified to meet particular end-use requirements. Improved materials, processes, and designs offer possibilities for expanding this growth.

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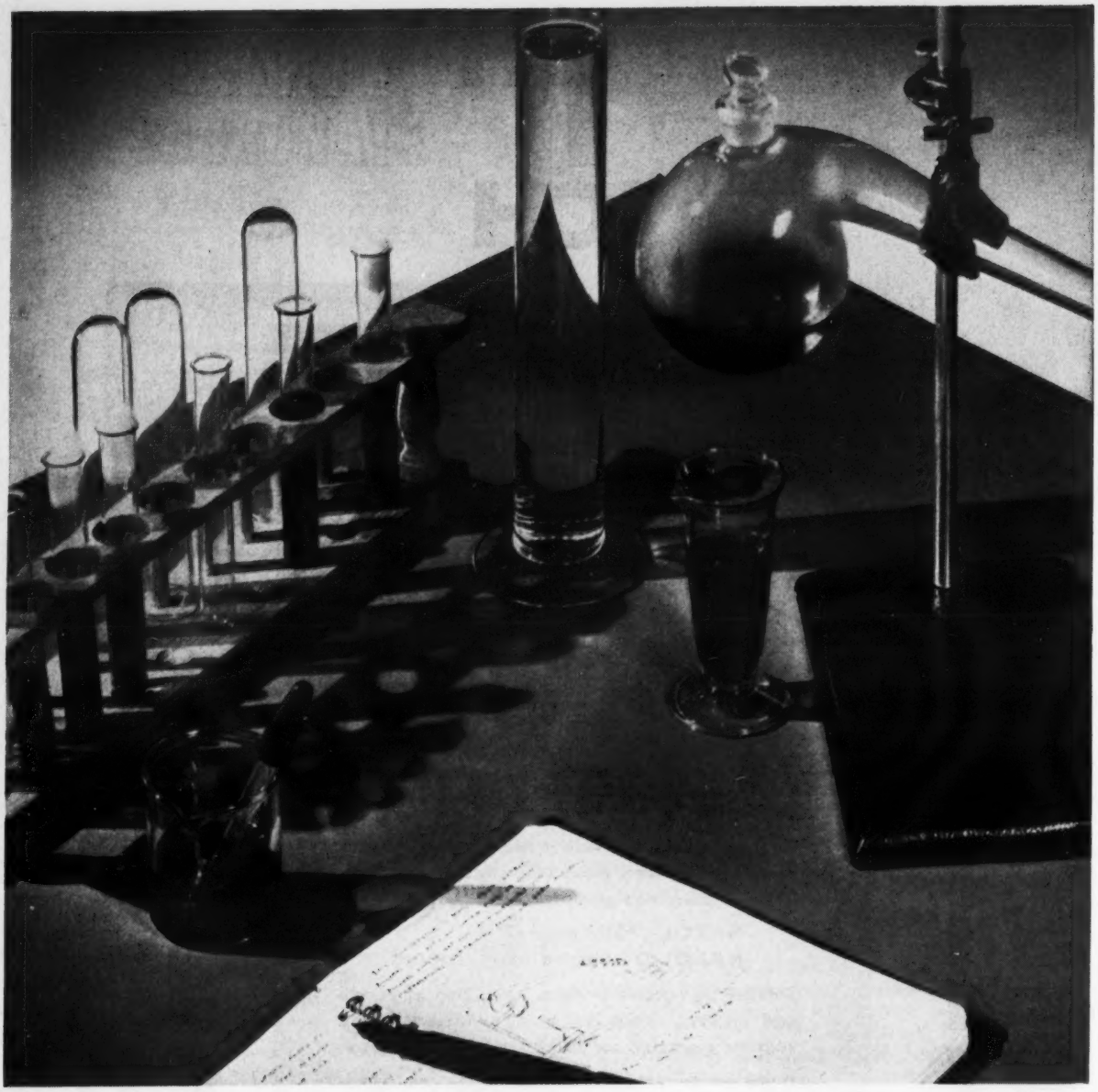

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Check 5053 opposite last page

CHEMICAL MATERIALS

Trio of adhesives for laminating Mylar

Three resin adhesives for packaging and industrial use are:

Resyn® 30-1246, a synthetic resin-based lacquer type, for laminating metallized Mylar to calendered vinyl film. May be used as a heat-seal coating. Has high bond strengths.

Resyn 36-6327 is a synthetic rubber-based lacquer for laminating treated polyethylene nitrocellulose, and vinyl-coated sheets to clear Mylar and all saran-coated films.

Resyn 36-6328 is also a rubber-based lacquer. It is for laminating clear Mylar and metallized Mylar to themselves and to paper.

(Resyns are products of National Adhesives, div. of National Starch Products Inc., 270 Madison Ave., New York 16, New York.)

Check 5054 opposite last page.

Silicone coating varnish has unusual properties for Class H use

Uses: For coating and binding Class H electrical insulation components.

Features: Low viscosity gives rapid penetration and wettability. Drying time is fast.

Description: Varnish contains 65% silicone solids in xylene, has viscosity of 75 to 175 cps. Cure time and temp may be varied.

(R-610 Silicone is a product of Silicones Div., Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.)

Check 5055 opposite last page.

Purification with carbon

Pocket-size 12-page booklet details use of Nuchar active carbons for purification and removal of tastes and odors in many chemical operations. "Nuchar for Purification, Reclamation" — West Virginia Pulp & Paper Co., 230 Park Ave., New York 17, N.Y.

Check 5056 opposite last page.

Methyl butynol derivatives in development quantities

Two derivatives of methyl butynol — methyl butenol and methyl hydroxy butanone — have variety of uses as intermediates in making perfumes, food colors and flavors, pharmaceuticals, and plastics. Both chemicals are suggested as solvent additives. Methyl hydroxy butanone is suggested as a uv-screener for furniture, textile and leather finishes, plastics, and cosmetics.

(Methyl butenol and methyl hydroxy butanone are available in development quantities from Air Reduction Chemical Co., Div. of Air Reduction Co., Inc., 150 East 42nd St., New York 17, N.Y.)

Check 5057 opposite last page.

Phenolic resin gives high resistance to chemicals, oil

Uses: Varnishes based on this resin are for can coatings, drum linings, industrial finishes, marine coatings.

Features: Durability tests indicated that varnishes of this resin offered about twice the resistance to salt water, chemicals, and oils as did three standard commercial phenolic varnishes.

Description: Plaskon pure phenolic resin 3725 has very light color, 117°C melting point (bar brush method).

(Plaskon resins are products of Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y.)

Check 5058 opposite last page.

What's cooking?

Technical bulletin of 34 pages on isophthalic alkyd cooking techniques shows it is easy to process these alkyds by fusion as well as by solution techniques. "Isophthalic Alkyd Cooking Techniques" — Oronite Chemical Co., 200 Bush St., San Francisco 20, Calif.

Check 5059 opposite last page.

More REACTIVE

SOLVAY CAUSTIC POTASH

...produces MORE SOLUBLE END PRODUCTS!

Many users select caustic potash, rather than lower cost caustic soda, because it saponifies fats and grease more readily, and—most important—provides extra efficiency.

Since it is more reactive, the products made from it are also generally more reactive—more soluble, more effective. In fact, many powerful cleaners—including some of the popular heavy-duty liquid detergents—are based on products produced from caustic potash.

We invite you to make your own test of Solvay Caustic Potash. Available in two grades —Technical and Mercury Cell—dry forms and liquid, in steel drums and tank cars.

Sodium Nitrite • Potassium Carbonate • Caustic Soda • Chlorine
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Check 5060 opposite last page

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Have you a current process or one contemplated that requires dispersion or deflocculation? See PQ for ways in which silicates can help you.

In the photo above, a stiff solid clay mud was liquified with only 0.2% N Sodium Silicate.

Deflocculating or dispersing action of silicates is now used in casting of ceramic wares, in slurries for roofing shingles, in clay processing, in the dispersion of pigments and minerals. Also, soluble silicates' efficiency in suspending dirt earns them wide preference in innumerable detergent processes.

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Associates: Phila. Quartz Co. of Calif., Berkeley, Calif.: National Silicates Limited, Toronto, Canada

Check 5061 opposite last page

Manufacturing process modifies emulsions for specific users

Uses: For textile and non-woven fabrics, paper, packaging, and general-adhesive applications.

Features: Manufacturing process permits modification of certain emulsion characteristics to meet specific requirements of individual users. Among qualities that can be modified are: speed of tack, water resistance, compounding characteristics, and particle size.

Description: Complete line of polyvinyl acetate homopolymer emulsions are produced in tankcar quantities for greater uniformity and better quality control. Resins are designated as 9350-LV, 9350-HV, 9153, 9360, and 9370 Plyamuls.

(PVAc emulsions are available from Reichhold Chemicals, Inc., 525 North Broadway, White Plains, N. Y.)

Check 5062 opposite last page.

Low-inhibitor grades of methyl, ethyl acrylates now available

Low-inhibitor grades of methyl and ethyl acrylate, containing 0.02% of inhibitor, are designed for polymerization and copolymerization without necessity for inhibitor removal. (Secret: use proper quantity of polymerization catalyst.)

(Methyl and Ethyl Acrylates are available from Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.)

Check 5063 opposite last page.

Plastics data file

Well-illustrated 12-page booklet gives detailed data on polyethylenes, vinyls, styrenes, phenolics, and epoxies. "1958 Condensed Reference File" — Bakelite Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.

Check 5064 opposite last page.

MASKING COMPOUNDS FOR LATEX FROM THE D&O LABS

To mask the often unpleasant odor of Natural Rubber Latex, the D&O Laboratories have developed two series of special compounds.

The first, *MULSOTEX*, are a group of odors designed to form uniform permanent emulsions when added to Natural Rubber Latex formulations containing an unusual percentage of water.

The second, *TEXAROME*, are a series of highly concentrated odors, recommended for use in formulations not containing a high percentage of water.

Both *MULSOTEX* and *TEXAROME* hold up well under heat, and will not cause coagulation of the base material.

Costs are competitive. More details on request.

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Check 5065 opposite last page

Activating plasticizer keeps vulcanizate hard and stiff

Gives good processing characteristics to the green stock

Uses: Material is low-cost activating plasticizer for rubber.

Features: Plasticizer maintains a high degree of hardness and stiffness in the vulcanizate while imparting excellent processing characteristics to the green stock. Due to its unusual wetting characteristics, material facilitates the incorporation of large amounts of reinforcing pigments and gives a smoothly running stock without excessive tack.

Description: Activating plasticizer, a brown liquid, can partially replace high styrene resins at no appreciable sacrifice of hardness, stiffness, or flex resistance when used in combination with reinforcing pigments. Its specific gravity is 0.99.

(Poly-Sperse R-100 is product of National Polychemicals, Inc., Wilmington, Mass.)

Check 5066 opposite last page.

Organic chemicals in pilot plant lots

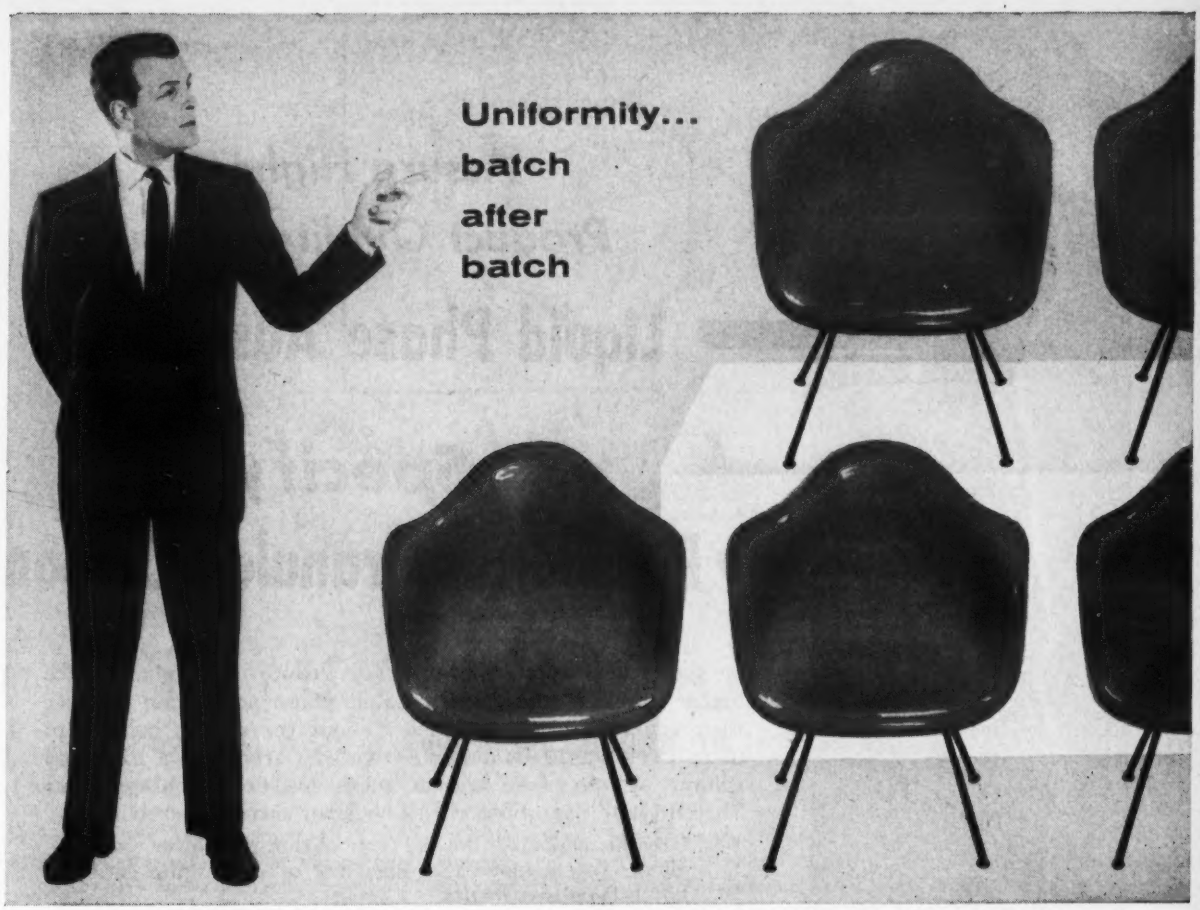
Fluorenone oxime, glycolic aldehyde, p-fluorophenol, monofluoroacetic acid, sodium and potassium monofluoroacetate, ethyl fluoroacetate and dihydroxymaleic acid are available in lab-scale amounts.

(Chemicals are available from Abco Chemical Co., 68 Fleet St., Jersey City 6, N.J.)

Check 5067 opposite last page.

Protective coatings

A detailed 75-page study of chemistry and physical behavior of cellulose acetate butyrate in protective coatings may be obtained by request to Chemical Division, Eastman Chemical Products, Inc., Kingsport, Tennessee.



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Now available is a new polyester resin grade of diethylene glycol. *This* CARBIDE *diglycol is produced specifically for the manufacture of polyesters and polyurethanes.*

Here are three outstanding advantages of this new polyester-resin grade chemical.

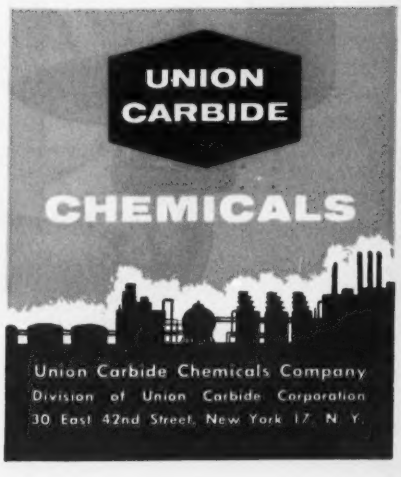
- Narrow boiling range which demonstrates product purity
- Controlled hydroxyl content assures uniform performance in processing
- Low ethylene glycol content to give polyesters with more uniform viscosity and excellent handling properties.

These stringent specifications help you obtain uniform batches — time after time.

Remember, whether you make a saturated or unsaturated polyester resin, there's a wide selection of CARBIDE glycols to choose from. These include —Ethylene glycol, Diethylene glycol, Triethylene glycol, Propylene glycol, Dipropylene glycol, 1,2,6-Hexanetriol and 1,5-Pentanediol.

For information on these glycols— or samples — write Union Carbide Chemicals Company, Room 328, 30 East 42nd Street, New York 17, New York. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

"Union Carbide" is a registered trade-mark of Union Carbide Corporation.



Check 5068 opposite last page

Assure Highest Product Quality in Your

Liquid Phase Adsorption

Specify

Pittsburgh Granular Carbon

IF your job is to increase efficiency, reduce costs and produce higher product quality in a liquid phase adsorption process, then you'll want to know *more* about the unique benefits of using PITTSBURGH Granular Activated Carbons in a fixed bed column system. Just look at these specific advantages over "batch-type" operations with powdered activated carbons:

1. Greater capacity, lower carbon dosage, lower cost. In effect, you achieve the efficiency of an infinite series of batch-type treatments.
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3. Cleaner operation, no slurrying or dusting problems.
4. Less equipment and maintenance—the ultimate in simplicity of operation.

What's *your* liquid phase adsorption problem? Decolorizing a solution? Refining a food product? Purifying a pharmaceutical? *Pittsburgh coal-derived Activated Carbons, used in a column system, will do a better job at lower cost.* And we have the facts to prove it!

You'll find there's a type of PITTSBURGH Granular Carbon ideally suited to solve your particular adsorption problem. *Write today for your free copy of information brochure on adsorption with activated carbons.*

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Check 5069 opposite last page

Epoxy-type plasticizer has good resistance to exposure, temp

Expected to up production for vinyl users

Uses: In making exterior-use products such as rain wear, garden hose, clothes lines, and awnings.

Features: Plasticizer has high resistance to exposure, temperature, and weather. It is expected to enable vinyl processors to increase production because of its combination of low viscosity, strong stabilizing action, and very low volatility. It has high-flexibility retention and is particularly useful in stabilizing formulations containing phosphate plasticizer, where it enables higher processing speeds and temperatures.

Description: Light-colored, polymeric, epoxy-type plasticizer is made with epoxidized soybean oils. When tested for straight water resistance in seven-day extraction tests, plasticizer was found to have appreciably higher moisture resistance than other plasticizers.

(Peroxidol 780 is product of Reichhold Chemicals, Inc., 525 North Broadway, White Plains, N. Y.)

Check 5070 opposite last page.

High-density polyethylene

Four-page data folder gives description, advantages, and data on Grex high-density polyethylene. "Grex" — Polymer Chemicals Div., W. R. Grace & Co., 225 Allwood Rd., Clifton, N.J.

Check 5071 opposite last page.

Plasticizer maintains low-temp flexibility in styrene-butadiene

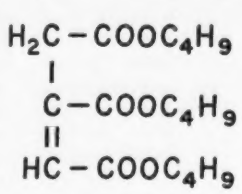
Improved heat-light stability to vinylidene chloride resins

Uses: Stable, liquid, plasticizer for vinyls, cellulosics, and styrene copolymers.

Features: Test results show

that plasticizer maintains low-temperature flexibility in styrene-butadiene copolymers, and imparts improved heat-and-light stability to vinylidene chloride resins.

Description: Stable plasticizer is an almost colorless



liquid 75-80% tributyl aconitate. The remainder is essentially an acetyl tributyl citrate. It has a specific gravity (25/25) of 1.0235, and refractive index (@25°C) of 1.4511.

(Technical grade of tributyl aconitate is available from Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, New York.)

Check 5072 opposite last page.

Catalyst stops crazing in molding, casting, or potting

Uses: As a catalyst for polymerization of polyester resins at room or low temperatures.

Features: Catalyst eliminates crazing. Faster gel times are obtained when catalyst is used with metallic promoters.

Description: Exotherm measurements show that this ketone peroxide catalyst combines fast gel time with a long cure time. Catalyst comes as a solid.

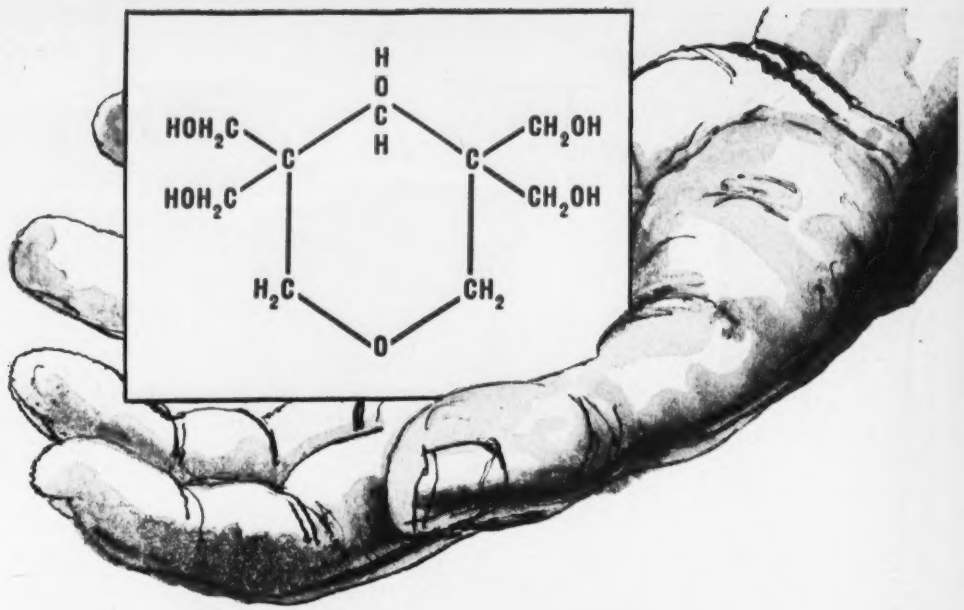
(Ketone Peroxide #6 is product of Lucidol Div., Wallace & Tiernan Inc., 1740 Military Rd., Buffalo 5, N. Y.)

Check 5073 opposite last page.

Resin, plasticizer data

Property data on coumarone-indene resins, modified styrene resins, and plasticizers are contained in 12-page bulletin. "Picco Resins" — Pennsylvania Industrial Chemical Corp., Clairton, Pa.

Check 5074 opposite last page.



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Developed by Celanese research and produced by aldol condensation process, anhydroenneahepitol is currently available in experimental quantities in aqueous solution. Evaluate this new Celanese intermediate yourself ... find out how it can contribute to lower cost and higher quality in your formulations. Celanese Corporation of America, Chemical Division, Dept. 591-E, 180 Madison Avenue, New York 16, N. Y.

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

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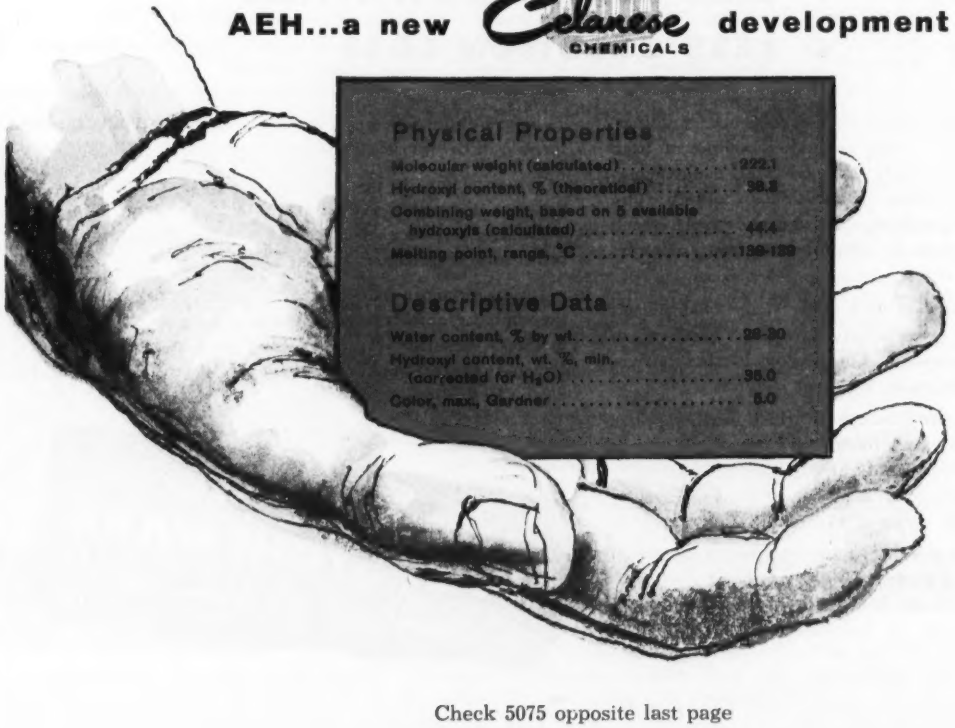
Physical Properties
Molecular weight (calculated) 222.1
Hydroxyl content, % (theoretical) 38.2
Combining weight, based on 5 available hydroxyls (calculated) 44.4
Melting point, range, °C 139-139
Descriptive Data
Water content, % by wt. 28-30
Hydroxyl content, wt. %, min. (corrected for H2O) 35.0
Color, max., Gardner 5.0

Check 5075 opposite last page

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2 LESS PLANT "DOWN-TIME"
3 LESS SOLUTION LOSS

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In one or more of their many forms, Tygon Plastics offer the engineer quickly effective ways to keep maintenance costs in check—superior ways to prolong plant and equipment life. If you'd like full data on all the Tygon Plastics, write for the Tygon Portfolio.

181F

PLASTICS AND SYNTHETICS DIVISION . . .

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Check 5076 opposite last page

All important properties of heat-transfer fluids in organic silicates

Uses: Recommended as heat-transfer media.

Features: Materials are characterized by relatively high specific heat, low viscosity, and low volatility. They have complete fluidity over wide temperature ranges, and are suitable in processes that require both heating and cooling in the same equipment, and with the same heat-transfer fluid.

Description: Higher organic silicates, tetra (2-ethylbutyl) silicate and tetra (2-ethylhexyl) silicate, are suitable for formulating lubricants and hydraulic fluids. Both silicates have freezing points below −100°F, and can thus be used in heat exchange equipment that may be exposed to severe winter temperatures. They are available in tank car quantities at a price of 65c per lb, f.o.b. South Charleston, West Virginia.

(Higher organic silicates are product of Union Carbide Chemicals Company, Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y.)

Check 5077 opposite last page.

PVC dispersion resin has unique property — top electrical quality

Viscosity stability is exceptional

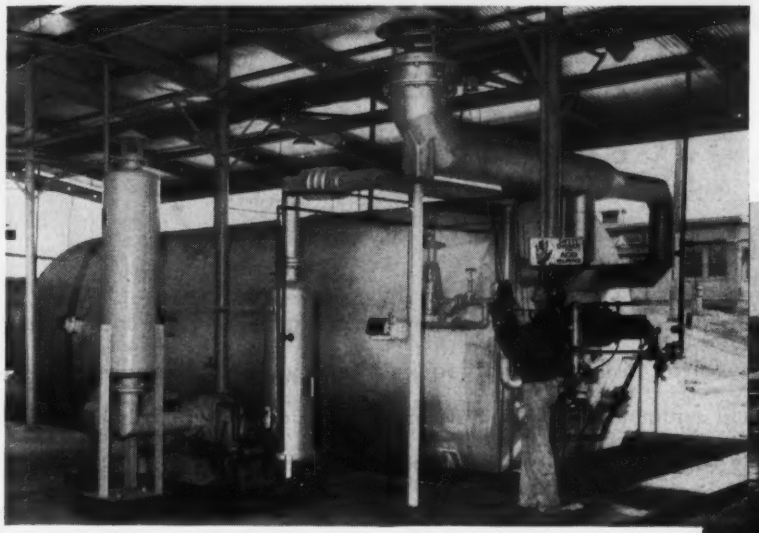
Uses: Resin was developed for plastisol and organosol applications.

Features: Exceptional electrical quality and high-viscosity stability are characteristic of this resin. It has low initial viscosity, good shelf life, and low water absorption.

Description: PVC dispersion resin contains only minor fractions of non-polymer. It is not a spray-dried product.

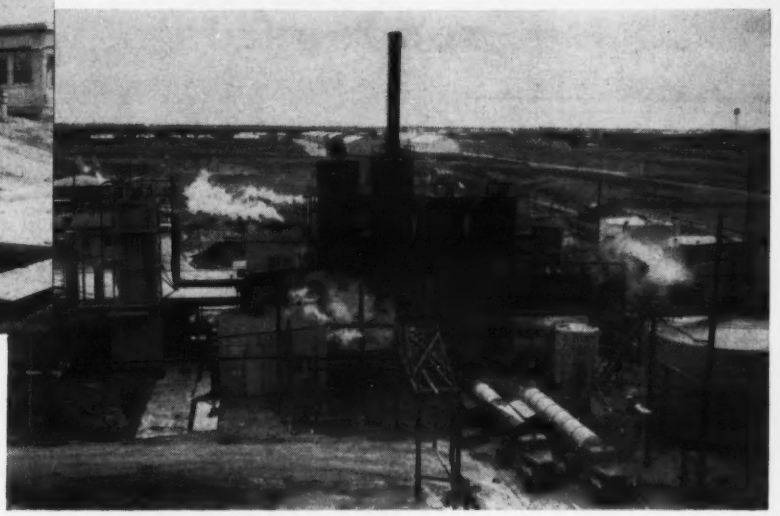
(Pliovic VO is product of Chemical Div., The Goodyear Tire & Rubber Company, Akron 16, Ohio.)

Check 5078 opposite last page.



Key equipment in the acid regeneration plant is this specially designed spent-acid furnace

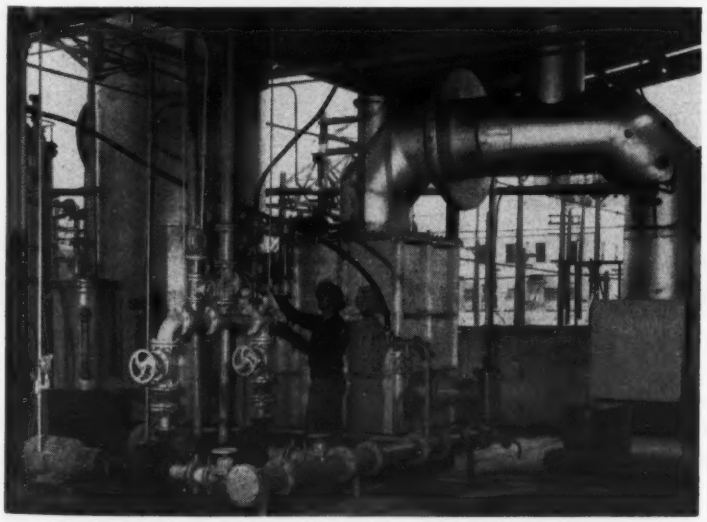
Overall view of the Sunflower, Kansas, sulfuric acid facilities. Plant can turn out 250 tons 100% H_2SO_4 per day



Now on stream, USI's new acid regeneration plant uses no water, only minimum fuel, and produces no effluent. Reported to be the most modern installation of its kind, plant . . .

Economically Processes 70 Tons Spent H_2SO_4 per day

TED F. MEINHOLD, Associate Editor
with **CLARENCE E. SCHULTZ,** Production Manager
U. S. Industrial Chemicals Co.
Division of National Distillers and Chemicals Corporation



Production foreman, Elmer Torneden, regulating flows to scrubber in the new acid plant

Based on the premise that spent sulfuric acid is not really "spent" but only "second hand", with plenty of use left in it, US Industrial Chemicals Co., Division of National Distillers and Chemical Corp., has added efficient H_2SO_4 regeneration facilities to its Sunflower, Kansas, acid plant. The new plant provides USI's midwest customers with a convenient and economical means of disposing of spent acid. It also boosts the acid capacity of the Sunflower plant to 250 tons per day on a 100% H_2SO_4 basis.

The regeneration plant is reported to be the most modern, flexible, and efficient installation of its kind for its size. Design capacity is 70 tons of alkylation spent acid per day. It operates in conjunction with the main acid plant, using the latter's drying and converting facilities to produce the final acid. The new plant uses only a minimum of outside fuel, no water, has no effluent, and can be operated with existing personnel from the main H_2SO_4 plant.

Basically, the installation decomposes the spent H_2SO_4 into SO_2, H_2O, and O_2. The SO_2 is then converted to SO_3, oleum, and H_2SO_4 in the main plant's equipment. Most of the heat used in the process is provided by hydrocarbons in the spent acid, while natural gas and sulfur furnish the balance. The regenerated acid is identical to that produced from sulfur.

In the regeneration process, spent acid is sprayed into a specially designed furnace maintained at about 2200°F. When alkylation acid is used, the hydrocarbon content is about 5 to 8%, which is high enough to furnish a substantial part of the fuel for the furnace. Remainder is provided by means of an auxiliary gas supply.

Gases leaving the furnace are cooled by a waste heat boiler. The gas is then taken into a saturating tower where a con-

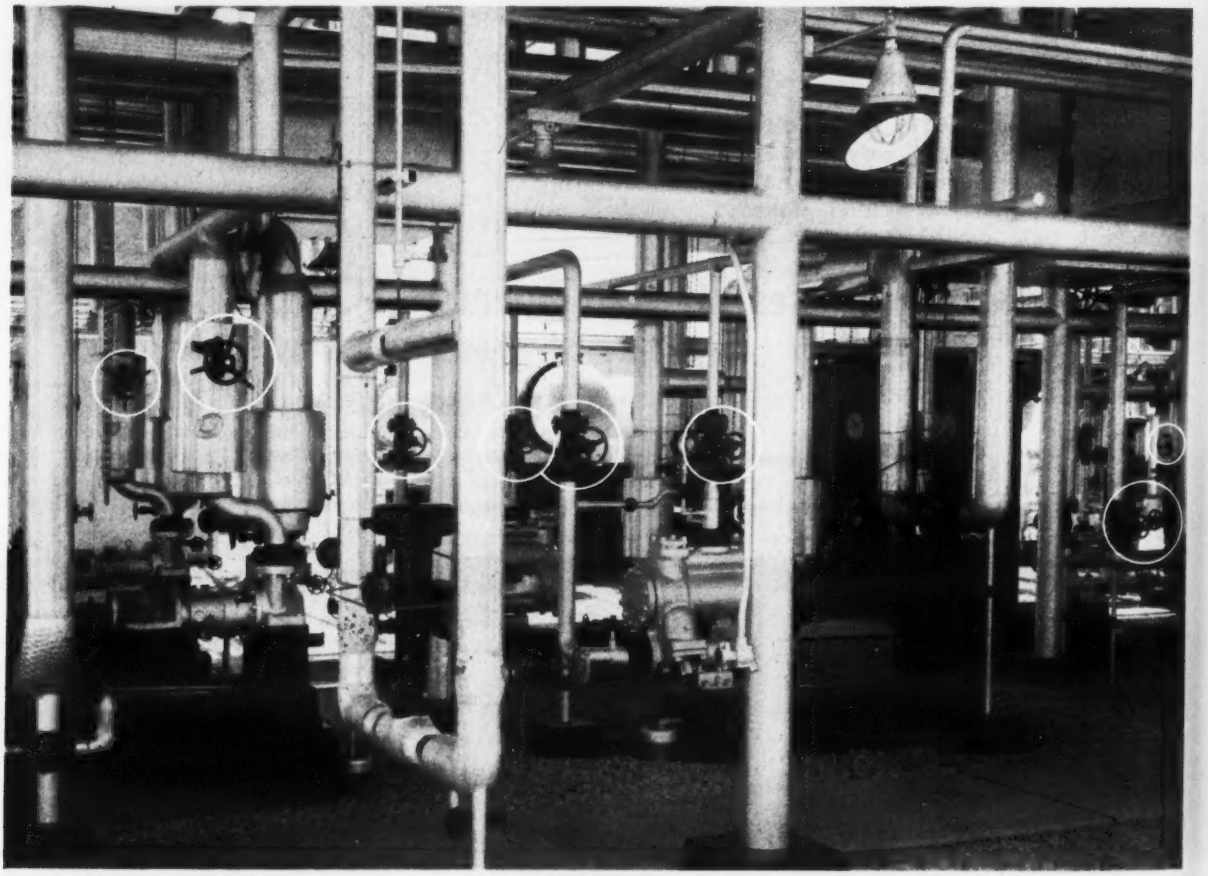
To page 114

STOP

PRODUCT CONTAMINATION BEFORE IT BEGINS BY USING ORBIT FORGED STEEL VALVES

ORBIT VALVES®

Because of the non-lubricated positive closure seating principle used in the Orbit Valve, costly maintenance and the possibility of fluid contamination carry-over from valve lubricants which lower catalyst efficiency, has been eliminated. Lubricant is not required for any part of the valve's mechanism that comes in contact with fluid being handled in cavity of valve.

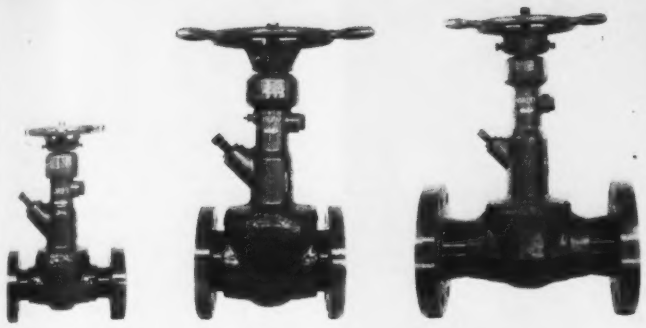


Orbit Valves in service on Still reflux and De-ethanizer feed pumps.

SIZES: 1", 1½", 2", 2½", 3", 4" and 6", Full Round Opening, Screwed or Flanged Ends, ASA 300 lbs. through ASA 2500 lbs. 2", 2½", 3", 4" and 6", Venturi Pattern, Flanged End Only, ASA 150 lbs. through ASA 2500 lbs.

SOURCE: Available through your favorite industrial supply house.

LITERATURE: Write Dept. B for Catalog 58-B and Service Manual No. 58.



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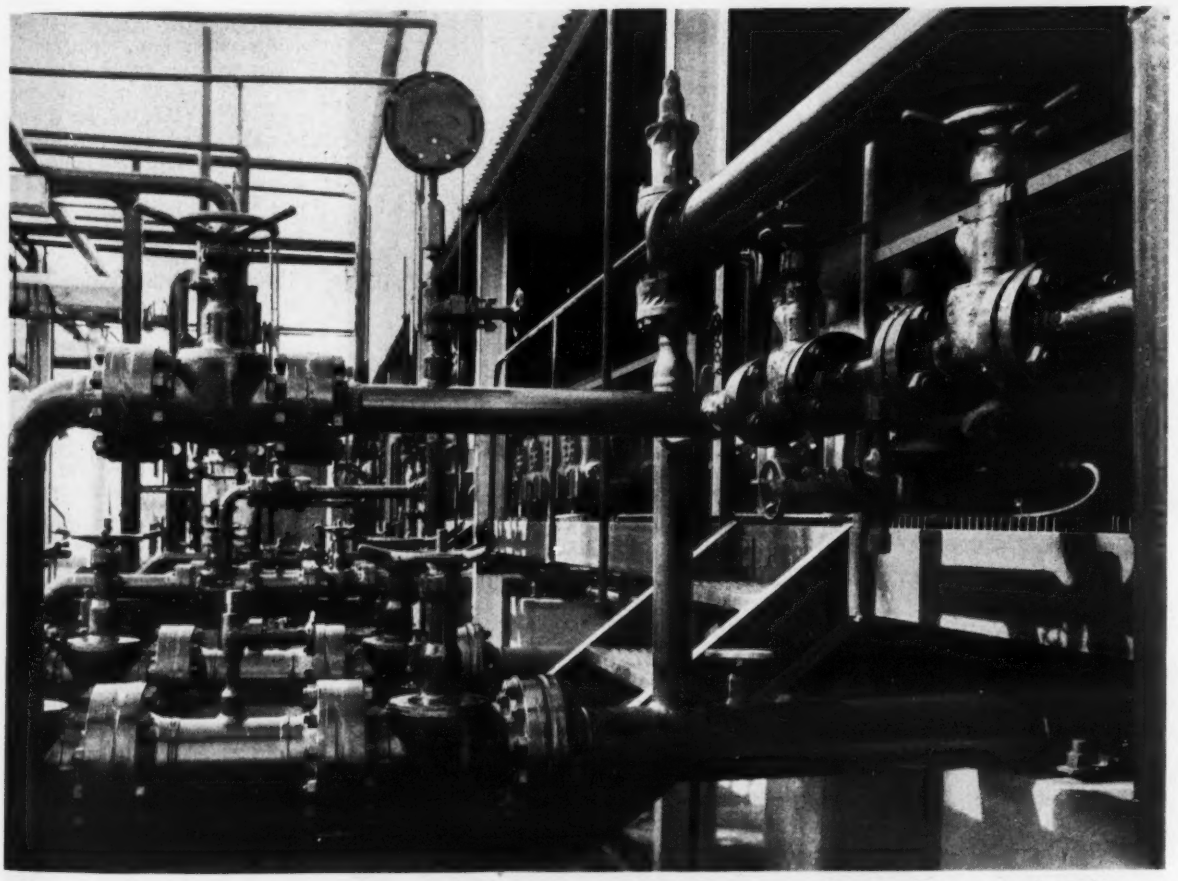
There are no voids or cavities in the body or bonnet of an Orbit forged steel valve where pressures can build up from trapped fluids when the valve is either in open or closed position. Body and bonnet is all forged steel, vapor-tight construction.

Stem packing chamber has great depth and capacity for easier adjustment and longer life of the packing. Stem packing is pliable and adjustable and can be added to or adjusted while the valve is in service under pressure.



Orbit Valves in typical Platformer service handling recycle hydrogen gas at approximately 500 psig and 100°F.

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Your BLUE RIBBON GUARANTEE

Each OTM product is guaranteed to be free from manufacturing defects. If failure occurs within one year after shipment, any OTM product will be replaced without charge when the following conditions have been met:

Provided it has been used as recommended and within A.S.A. and A.G.A. specifications and in accordance with recognized practices.

When the product is to be welded, provided it has been welded in accordance with recognized practices and within such Standards as A.S.M.E. and A.W.S. Codes.

Provided it has not been worn out due to severe operating service, such as is encountered under extremely corrosive, abrasive or acid conditions which the steel was not made to withstand.

OTM Corporation will pay all transportation charges and any necessary expense incurred to remove and replace any OTM product proved to be defective.

This is the broadest and most specific guarantee in the industry. You are CERTAIN of the superior performance of BLUE RIBBON PRODUCTS!

If you believe any OTM product to be defective, regardless of how minor the problem may be, call Mr. Kenneth H. Bradshaw collect (person to person) before making any final decision.

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IDEAS

From page 111

stantly recirculated weak-acid stream converts the latent heat to sensible heat. The effluent is used as a diluent, after the SO_2 has been stripped from it.

The gases are then further cooled by means of a graphite tube and shell heat exchanger. Water from the main acid plant's cooling tower is used for this purpose. Cooled gas contains about the following average volume percent on a dry basis: SO_2, 10%; CO_2, 12%; O_2, 5%; and N_2, 73%. It is saturated at 100°F and contains about 100 mg H_2SO_4 mist per cu ft, wet basis. Gas is then fed to an electrostatic precipitator where 99% of the acid mist is removed.

Leaving the precipitator, the purified gas is sent to the main acid plant where it enters the regular process stream at the drying tower. Following this it is converted to oleum and H_2SO_4 by means of conventional equipment in the contact process.

The spent regeneration plant is designed to process, in 24 hours of normal operation, 70 tons of alkylation spent acid having an analysis of 87% acid, 8% hydrocarbons as CH_2 and 5% water, and producing from this 37.2 short tons of an 8½% SO_2 gas (by volume). These figures can be increased slightly.

(Sulfuric acid regeneration plant was designed by Chemical Construction Corporation, 525 West 43rd Street, New York 36, New York. Construction was carried out under the direct supervision of plant personnel, and H. A. Rothwell, plant manager.)

Check 5081 opposite last page.

Russ articles translated

Catalog of 32 pages lists translations of recent Russian research articles on catalysis, geochemistry, analytical chemistry, atomic energy, and other special fields. Russian Research in Chemical Sciences, Cat 3 — Consultants Bureau, Inc., 227 West 17th St., New York 11, N.Y.

Check 5082 opposite last page.

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

ISOSEBACIC® Acid Process Covered by 8 U.S.I. Patents

Synthesis of U.S.I.'s new intermediate for the plastics industry, ISOSEBACIC Acid, is detailed in a series of eight patents issued on December 17 of this past year to Dr. Charles E. Frank and other members of the company's research laboratories. Dr. Frank is discussing the material contained in these patents before the alkali metals symposium at the ACS meeting in San Francisco this month.

The new intermediate is a mixture of sebacic acid, 2-ethylsuberic acid and 2,5-diethyladipic acid – the latter two compounds being relatively unknown until the development of this synthesis. Here are the patent numbers and the subjects they cover:

USP 2,816,913—Preparation of Substituted Acids
USP 2,816,914—Dimerization Process
USP 2,816,916—Dimerization Process
USP 2,816,917—Selective Process for Dimerization of Unsaturated Hydrocarbons
USP 2,816,918—Carbonation Method
USP 2,816,919—Method of Preparing Acyclic Carboxylic Acids
USP 2,816,935—Process for the Preparation of Alkali Metal Derivatives of Conjugated Diolefins and Vinyl Aromatic Compounds
USP 2,816,936—Process for Formation of Dialkali Metal Dimers of Diolefins

A plant to produce ISOSEBACIC Acid in commercial quantity is now starting up at U.S.I.'s major chemical complex in Tuscola, Illinois. Potential applications of the new intermediate include the manufacture of plasticizers, ester lubricants, alkyds, polyamides, polyurethanes, reinforced plastics and in chemical synthesis.

New Motor Pump Designed To Move Liquid Metals in Nuclear Power Reactors

A new type of pump has been developed to circulate liquid metal coolants such as sodium and sodium-potassium (NaK) at high temperature through hermetically sealed systems in nuclear power plants.

The prototype for the new pump was tested at temperatures up to 1,265°F. After 3,500 hours of operation at temperatures constantly above 1,000°F., inspection showed all parts of the pump to be in excellent condition.

Since some liquid metals are not only chemically active but also become radioactive when used as coolants in nuclear reactors, the liquid metal pump is hermetically sealed to make it leak-proof. It can be obtained in capacities ranging from 150 to 5,000 gallons per minute at operating temperatures up to 1,600°F.

The operating temperature of the new pump motor is said to be independent of the temperature of the liquid metal being circulated, permitting operation in reactor systems where temperatures are even higher than the 1,265°F used in testing.

Other equipment for handling liquid sodium is discussed in a booklet entitled "Handling Liquid Sodium" which is published by U.S.I.

Mallory-Sharon Zirconium Plant Comes Onstream at Ashtabula, O.

2,000,000 Pound-Per-Year Plant Also Produces Hafnium

The new Mallory-Sharon Metals Corporation is owned one-third each by National Distillers, P. R. Mallory and Sharon Steel. Zirconium sponge and platelets are now in production at the company's new plant in Ashtabula, Ohio. Half the output of the installation is committed for the next five years under contract with the Atomic Energy Commission. The balance is available to industry in both commercial and reactor grades for nuclear work as well as for structural use where high corrosion resistance is desired.

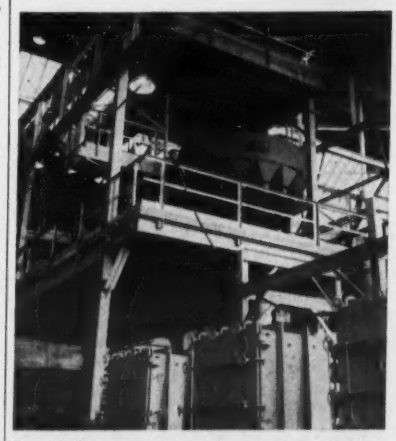
Hafnium tetrachloride, oxide, sponge and platelets are also produced as an adjunct to the zirconium operation. Hafnium, because of its ready absorption of neutrons, makes excellent control rod material in reactor cores. It is in fact used for that purpose in the Shippingport installation now delivering electricity to the commercial grid of the Duquesne Light Co.

Sodium Reduction Process Employed

The new plant is the first to make zirconium sponge and platelets employing semi-continuous production techniques developed by the U.S.I. research group. These techniques involve the use of sodium as the reducing agent for zirconium tetrachloride, and yield sponge of greater purity as a result. The method, which is also being applied to other metals such as hafnium and titanium, tantalum and columbium (niobium), has the advantage over other processes of a lower initial investment cost.

Mallory-Sharon Metals has been granted an exclusive license to use this process. The sodium for the process comes from the U.S.I. sodium operation three-quarters of a mile from the new plant.

MORE



Part of the processing equipment at the Mallory-Sharon Metals zirconium plant, now onstream at Ashtabula, Ohio.

Moffett Becomes Assistant Sales Manager for U.S.I. Polyethylene Resins

John K. Moffett, Jr. has been appointed as Assistant Manager of PETROTHENE® Polyethylene Sales at U.S.I. Mr. Moffett graduated from Yale in 1948 and has been employed since that time by U.S.I. in various capacities. He was supervisor of the company's sodium peroxide plant, head of sodium peroxide sales, and at the time of his new appointment was in a sales development position for U.S.I. PETROTHENE polyethylene resins.

U.S.I. Building Tantalum-Columbium Pilot Plant

U.S.I. is constructing a pilot plant to produce tantalum and columbium metals in Cincinnati, Ohio, site of the U.S.I. Research Laboratories. Part of the same facilities that were employed for piloting zirconium and titanium will be used in the new pilot unit, which is expected to be onstream shortly.

Capacity of the pilot plant will be one ton of combined metals per month on a one shift per day basis, three tons per month on a round-the-clock basis. The two metals will be produced in approximately equal quantities although variations of from 10% tantalum up to 60% tantalum are possible, depending upon the ore used.

The tantalum and columbium (also called niobium) will be produced by a U.S.I.-developed sodium reduction process. A sodium reduction process is in use at the Ashtabula, Ohio zirconium plant of Mallory-Sharon Metals, which is one-third owned by U.S.I.-National Distillers. A related process will also be used in the Mallory-Sharon titanium plant now under construction at Ashtabula.

Pilot operation and initial market development programs for tantalum and columbium will be undertaken by U.S.I. independently of its association with Mallory-Sharon Metals. However, it is expected that any commercial facilities to be built after the pilot plant pro-

MORE

U.S.I. CHEMICAL NEWS

CONTINUED

Zirconium Plant

Zirconium Platelets Non-Pyrophoric

Reactor and commercial grades of zirconium are being supplied by Mallory-Sharon Metals in the form of sponge, platelets, unalloyed zirconium and zircaloy ingots and mill products. Platelets—irregular, flake-like pieces about the size of dimes, and quarters—are non-pyrophoric and non-hygroscopic. They insure greater safety during handling and shipping. They can be compacted for melting as easily as sponge and with virtually no waste. They are of extremely high purity, being almost completely free of sodium, magnesium, chlorides, hydrogen and moisture.

Zirconium Role in Reactors

Reactor-grade zirconium is essential as structural material for atomic reactors and for cladding uranium because of its ability to let neutrons pass through, thereby permitting maximum fuel efficiency of the reactor. Zirconium also has extremely high corrosion and heat resistance, vital to atomic energy applications. Hafnium, always found associated with zirconium in the natural state, must be removed in an extra refining step in the manufacture of reactor-grade material, because of its neutron-trapping properties. Hafnium does not interfere with zirconium's corrosion resistance, however.

Zirconium Role in Chemical Industry

Commercial-grade zirconium, with 1-3% hafnium content, shows great promise for the chemical process industries. It has excellent resistance to acids, alkalies, chlorine and chlorides, corrosion and heat, combined with strength, ductility, light weight and good machining properties.

CONTINUED

Pilot Plant

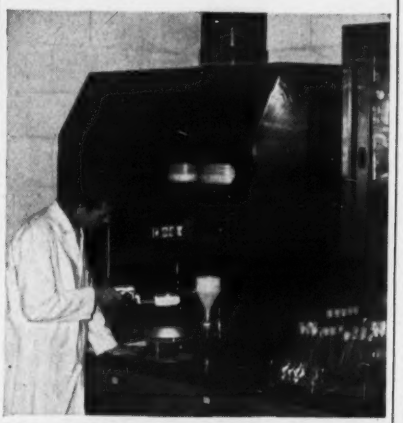
gram is completed, will be owned by Mallory-Sharon Metals.

Primary market for tantalum is expected to be the chemical process industries where it has long been used because of its chemical inertness, especially to hydrochloric acid.

Columbium, or niobium as it is often called, has been in demand as an alloying material for steel. More recent interest in this metal stems from its properties of low neutron cross-section, high-temperature strength, high melting point and the insolubility of columbium oxide in the metal at elevated temperatures. This combination of properties makes it a material with considerable promise for nuclear applications, including gas-cooled atomic reactors, as well as certain applications in supersonic aircraft and gas turbines.

Black Polyethylene Used For Ventilating Systems In Chemical Laboratories

Ventilating systems for laboratories, which will withstand corrosive fumes without deteriorating or discoloring, are now being fabricated completely of black, all-weather polyethylene. Since polyethylene compounded with black is expected to give 15 to 20 years of service, its substitution for metal should reduce maintenance and replacement problems substantially on fume hoods, exhaust stacks, fans and fittings.



Black polyethylene fume hood and stack exhaust acid vapors without deteriorating, cut replacement costs (photo courtesy American Agile).

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

For corrosion studies, two special solutions are now offered which isolate surface films from metals. An iodine-methanol solution is designed for aluminum alloys containing no copper, an iodine-methanol sulfosalicylic acid solution for aluminum-copper alloys. **No. 1340**

New 24-page booklet on titanium—includes physical and mechanical properties, metallurgy, corrosion resistance, methods of machining, forming and welding. **No. 1341**

Atomic lamps said to provide power-free, uninterrupted light for up to 10 years have been developed. They use radioactive krypton—85 gas to excite specially processed, hermetically sealed phosphor crystals. **No. 1342**

Cost of polyurethane installations foamed-in-place can be estimated with a nomagraph chart now available. Thickness, area, density of stock and price per pound must be known. Chart eliminates need for calculation. **No. 1343**

Concentrated (98%) ethylene diamine can now be obtained in commercial quantities for use by manufacturers of textile finishing and polyamine resins, synthetic waxes, rubber chemicals, fungicides, pharmaceuticals. **No. 1344**

New polyethylene-to-metal adapter has been devised to connect polyethylene and metal pipes and fittings without using clamps. It consists of a threaded polyethylene gasket between metal nut and tailpiece. **No. 1345**

4,4'-Diaminostilbene is available in laboratory quantity. It is readily soluble in methanol and ethanol, sparingly soluble in carbon disulfide, benzene, hot water. Forms azo dyes, useful as organic intermediate. **No. 1346**

Ten new atomic models for constructing organic metal chelates are now on the market. They are scaled to a magnification of 1.5×10^8. Four models represent the central metal atoms. Others used for rest of chelate. **No. 1347**

New silicone fluid of low viscosity has been introduced for use as a damping medium and hydraulic fluid. Is claimed to have lower viscosity-temperature coefficient and lower pour point than most methyl silicone fluids. **No. 1348**

Pyroglutamic acid (L-2-pyrrolidone-5-carboxylic acid) is now offered in pilot plant quantities. This heterocyclic amino acid has 2 reactive positions—a carboxyl and a cyclic amide group. Suggested as intermediate and for resolving racemic mixtures of amines. **No. 1349**

PRODUCTS OF U.S.I.

Alcohols: Ethyl (pure and all denatured formulas); Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

PETROTHENE® Polyethylene Resins

Development Chemicals: Ethylaluminum Sesquichloride, Methylaluminum Sesquichloride, Monomethyl Hydrazine, Triethyl Aluminum, Trimethyl Aluminum, Unsymmetrical Dimethyl Hydrazine.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K_3), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B_{12} Feed Supplements, Vitamin D_3, Vitamin E Products, Vitamin E and BHT Products.

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Models reduce cost of precipitators, up efficiency

By revising existing jobs, capacities are increased

In precipitator operation, each inch of pressure drop is equal to a capitalized investment of 40,000 to $80,000. Transparent, three-dimensional models of precipitator design, including flues, are bidding to lower pressure drop and increase efficiency for a large manufacturer of electrostatic precipitators. Tests have shown that design changes can mean a decrease in pressure drop of as much as 40%.

Models have been used not only to design units for new installations but to revise existing facilities.

Correlation between model studies and full-size plant studies has been demonstrated. In an existing installation, model studies resulted in an efficiency increase from 96.4 to 98.3%. Stack dust loading was cut from 0.11 to 0.05 grains per cubic foot. Velocity studies showed that flow patterns correlated closely.

A further advantage found in models was in designing units for plants where equipment positioning was already fixed and space limited. For a large aluminum plant where 43 precipitators were installed, separate flue designs were reduced from more than twenty to seven basic arrangements resulting in a substantial dollar saving in design and fabrication costs.

Model costs vary between 1 and 2% of precipitator cost and can be built in six to eight weeks after preliminary drawings have been made.

(For more information on precipitator model studies, contact Research-Cottrell Inc., Bound Brook, N.J.)

Check 5083 opposite last page.

Emery NEWS

WEIGHING SYSTEM

BIN, TANK AND HOPPER EDITION No. 8

Covering design, development and application data on Emery Weighing Systems for industrial applications.

AMAZINGLY SIMPLE EMERY WEIGHING SYSTEMS SPEED CONTROL OF CONTENTS IN MULTI-TANK OPERATIONS

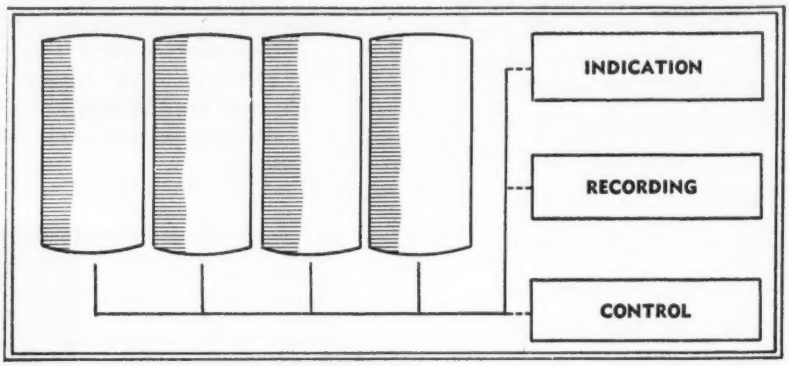
RUGGED EQUIPMENT OF CLOSED HYDRAULIC SYSTEM GIVES MAXIMUM ACCURACY AS WELL AS PRACTICALLY MAINTENANCE-FREE PERFORMANCE.

The key to the renowned accuracy, repeatability and maintenance-free operation of the Emery Weighing Systems is the unbelievable simplicity of the sturdy Emery Hydraulic Load Cell. Built with the precision characteristic of all top-quality instruments, the Emery Cell incorporates the ruggedness which makes it ideally suitable for rough industrial usage.

In effect, the Emery Cell is a transducer which converts load into proportional pressures which, in turn, are used to operate suitable instrumentation. The Emery Load Cell nullifies the use of complicated electrical circuits and electronic devices. Any man in your shop can understand and operate an Emery Weighing System.

In multi-tank operations, the Emery Weighing System is particularly applicable. Because of the simplicity of its design, it is usually less expensive than the more complicated weighing systems. Yet, in use, it provides uncanny accuracy and repeatability and all tanks can be weighed and controlled from one control station.

Whether you want simple indication, recording, combination indication and recording, simple or complex control, or a variety of printed forms, investigate the possibility of using the usually less expensive and easily the most simple tank weighing system available today.



WHAT DOES YOUR PROCESS REQUIRE?

Is simple weight indication adequate? Do you need recording? Could you use printed records? Do you want automatic control? All of them are readily available to you either at the tanks or at a remote station.

BUY SIMPLICITY . . .

When you buy a tank-weighing system, buy the readily understandable, easy-to-operate, maintenance-free, Emery Weighing System. Don't burden your processing operations with complex, hard-to-handle, electronic circuits and devices. **Stay simple . . . buy Emery!**

FOXBORO

Quality Instrumentation

One instrument manufacturer whose products team up effectively with the simple design of the Emery Load Cell is The Foxboro Company.

Shown here is the well-known Foxboro Circular Chart Recorder with an Indicator Dial. This instrument is eminently suitable for multi-tank installations.

Our engineers will gladly discuss the application of Foxboro instrumentation or instrumentation of any other top quality manufacturer to your Emery Systems.

PLEASE SEND ME
YOUR BULLETIN 561 ☐ 571 ☐
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NAME _____

COMPANY _____

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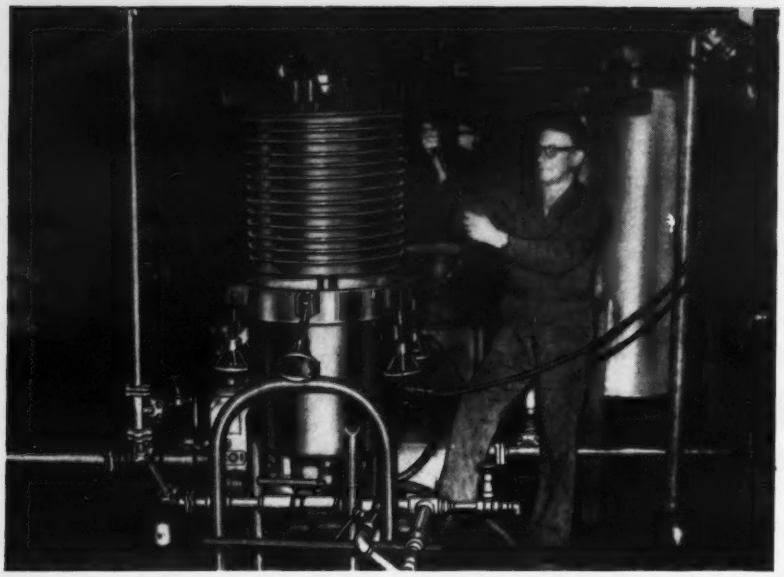
CITY _____ STATE _____

THE A. H. EMERY COMPANY
Pine Street • New Canaan, Conn.

Check 5085 opposite last page

For more information on product at left, specify 5084 . . . see information request blank opposite last page.



Filter downtime cut 50%
and there's no scavenging necessary

THAT'S THE REPORT from Mr. G. E. Bradly, Jr., Assistant Factory Manager for Vanderbilt Chemical Co. at Bethel, Connecticut, on his experience with a new Niagara Batch-Miser® filter.

After cleaning, this Niagara Filter is *back on stream in minutes.* That's because disassembly, cleaning, and reassembly are made far easier by Niagara's advanced design which eliminates tie rods.

There's *no separate scavenging operation* with this Niagara Filter either. Downtime is reduced, and there is no liquid heel left at the end of the filtration cycle.

With Niagara Filters you can realize similar savings in your plant. First step — consult the Chemical Engineering Catalog for facts on Niagara Filters, or write us today, outlining your requirements.

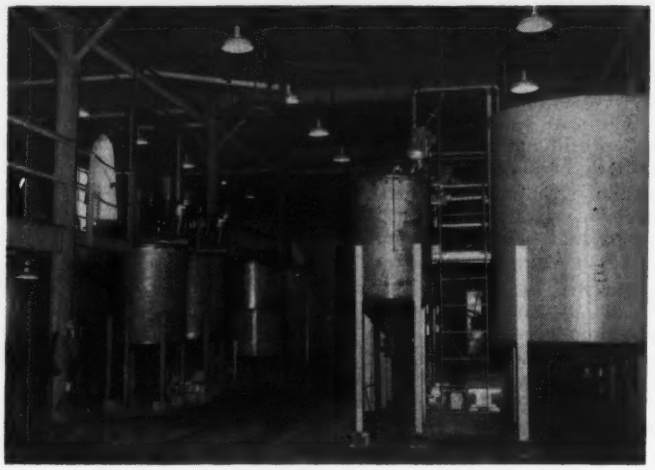
Niagara® FILTERS

A DIVISION OF

American Machine and Metals, Inc.

Dept. CPN-558, EAST MOLINE, ILLINOIS
(Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland)
SPECIALISTS IN LIQUID-SOLIDS SEPARATION

Check 5086 opposite last page



Here's another example of how private industry is getting more and more into the nuclear field. This fully integrated plant fills the important gap between the supplier of atomic raw materials and the user of the fuel in reactors. First privately financed installation of its kind, it . . .

provides for

A few of the products made in the plant: foreground, left to right: uranium oxide powder (U_3O_8), thorium oxide-uranium oxide sintered compacts, uranium oxide UO_2 powder, thorium oxide powder, thorium metal compacts. Background, magnesium-20% thorium master alloy

The first completely integrated plant constructed by private capital for the production of nuclear reactor feed materials is now in operation at Erwin, Tennessee. Built by Davison Chemical Company, Division of W. R. Grace & Co., the facility occupies the important intermediate position between private producers of thorium and uranium raw materials and the ultimate users of these nuclear materials in reactors.

Located in the foothills of the Smoky Mountains, not too far away from the giant AEC installation at Oak Ridge, the plant is equipped and staffed to provide the great flexibility and variety of services required today by the nuclear industry. Whatever the industry needs in the way of reactor feed materials, either solid or liquid, the Erwin installation can supply.

Purifies and Fabricates

Thorium and uranium raw materials as obtained from industrial or AEC sources are not suited chemically or physically for reactor operation. They require purification and other processing, and perhaps fabrication into desired physical forms. Since it is the policy

Loading shipping container in "bird cage" type crate. Rods are stainless steel containing uranium oxide-thorium oxide high-density compacts ready for use in reactors

"Wet" area where uranium and thorium are processed in liquid media. Plant can also process waste and recover scrap uranium and thorium

complete processing services nuclear feed materials

of the AEC to stop supplying products or services once they become available from private industry, the Erwin plant occupies a good spot in the field.

Davison claims the following for its installation:

1) It is the only facility in private industry using the pulse-type solvent extraction process (developed by AEC) for purifying uranium and thorium.

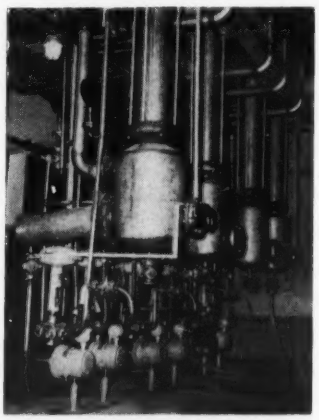
2) It is the only private facility equipped to convert in quantity slightly enriched uranium hexafluoride (the form in which enriched uranium is produced by AEC) to uranium oxide or uranium metal, the elemental form.

3) It is the only completely integrated plant for producing uranium and thorium oxides (powder forms), compacting and heat treating them, assembling them into tubes, and recovering scrap.

Manufactures on Custom Basis

In conformity with the needs of the industry, manufacture at the plant is one of many variations. Since the source materials vary in enrichment, concentration, and other characteristics, there is no end to the possible variations in products desired for reactor use.

Processing is carried out in three buildings — the metals,



Bottom view of 35-ft high stainless steel, pulse-type solvent extraction columns in the plant. Units are used for refining uranium and thorium

Labor savings will pay for these 6 new BATCH-MASTERS® in less than 2 years

Nutley, N. J. — In expanding its production facilities for Gantrisin, one of their sulfa group pharmaceuticals, Hoffmann-LaRoche, Inc., had the option of selecting nine 48″ conventional centrifugals or six 48″ Tolhurst Batch-Master® machines.

After considering that only one man is required to tend each two "Batch-Masters," while four men are needed for every three conventional units, the manufacturer decided on the former machines. The resulting 75% labor savings will offset the total cost of the new machines in approximately 18 months.

The "Batch-Master's" fast bottom discharge and hydraulic unloading make the difference in labor requirements and in batch processing cycle time.

FOR MORE COMPLETE DATA, SEE TOLHURST'S SECTION IN CHEMICAL ENGINEERING CATALOG or write

Tolhurst CENTRIFUGALS

A DIVISION OF

American Machine and Metals, Inc.

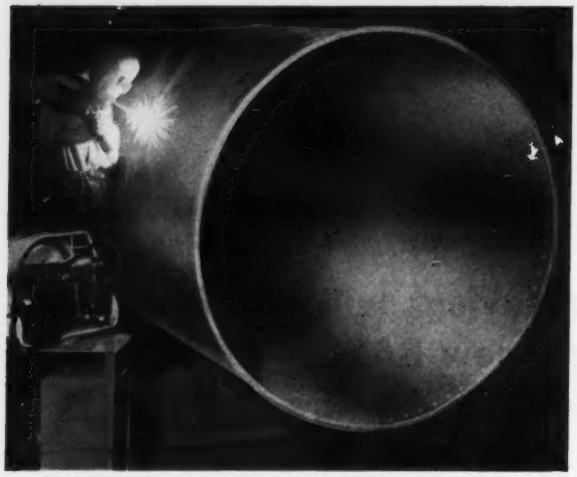
Dept. CPT-558, EAST MOLINE, ILLINOIS

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

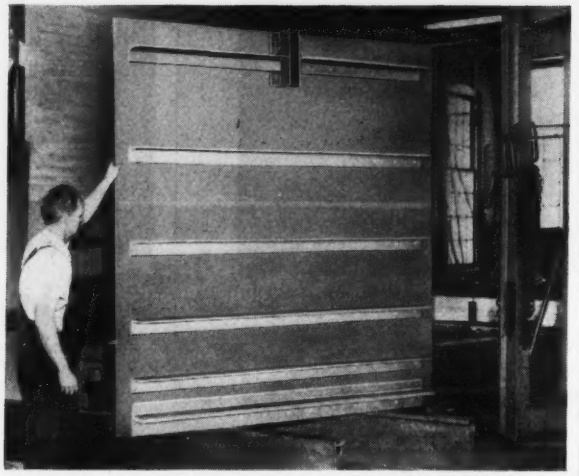
Check 5087 opposite last page

CUT CORROSION LOSSES

Get unusual corrosion resistance, plus high strength, toughness, weldability, and easy fabrication with Everdur,® Anaconda copper-silicon alloys

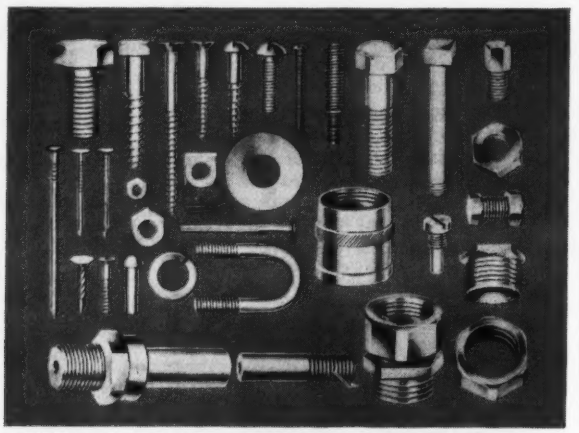


TANKS AND INDUSTRIAL EQUIPMENT requiring a combination of high strength, toughness and resistance to corrosion. Hot water storage heaters and tanks, unfired pressure vessels of Everdur are readily fabricated by welding.



IN WATER AND WASTE SYSTEMS, Everdur alloys provide easy fabrication and long service in a wide variety of jobs—from gates on to bolts and nuts. Their high strength makes possible lightweight, built-up assemblies of wrought metal.

ELECTRICAL CONDUIT of Everdur protects electric lines in corrosive environments, withstands vibration and abrasion —at oil refineries, in underwater tunnels (above), chemical plants. Made in two wall thicknesses—R.C. and E.M.T.



FASTENINGS AND SCREW MACHINE PARTS. Everdur is available in forms for hot heading and forging of bolts and accessories, severe cold-working operations for bolts and screws—and as free-cutting rod for screw machine products.

Whenever you have a tough problem calling for high strength with immunity to rust, and corrosion resistance equivalent to pure copper, consider an Everdur alloy. It may save you a lot of trouble and money. For details on properties and applications of Everdur alloys, write for Publication E-5. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

EVERDUR

COPPER-SILICON ALLOYS

products of

ANACONDA®

Made by The American Brass Company

Check 5088 opposite last page

chemical process, and ceramics buildings. Each is equipped with new and specially designed, multi-purpose facilities.

Although Davison wishes to be regarded primarily as a chemical processor of materials, the plant is capable of carrying out such physical and metallurgical operations as pelleting of oxides, high-temperature sintering, loading pellets into rods, and fabricating metal or alloy ingots into bars, rods, sheets, etc. Scrap recovery services are also available to feed material customers.

The plant is completely integrated with respect to meeting state and AEC licensing requirements. Included are such programs as regulations over waste disposal, health physics monitoring, security (both as to materials and documents), nuclear materials accountability, and property and liability insurance under the Nuclear Energy Property Insurance Association and Nuclear Energy Liability Insurance Association.

(Further information about the nuclear reactor materials plant may be obtained from Davison Chemical Company, Division of W. R. Grace & Co., 101 North Charles Street, Baltimore 3, Maryland.)

Check 5089 opposite last page.

Solvent-tanning process for leather is quick and continuous

Three-stage machine reduces processing time to minutes

Tanning operations that used to take from one to two weeks are now being done in a matter of minutes through the use of continuous solvent-tanning equipment. The new process brings automation to the ancient craft of leather production.

Key to the operation is a three-stage machine that makes possible continuous tanning, fat-liquoring, and drying of upper leather in a solvent system. Developed by Seco Venture, Peabody, Mass., a prototype of the unit has

been in limited operation at Eagle-Ottawa Leather Co., Grand Haven, Mich., for over a year.

The Secotan machine takes the hides after they have been trimmed, slit, and soaked in conventional water solution that contains the tanning chemicals.

In the first stage, the hides are dehydrated and tanned by the substitution of solvent for water. Hides are moved automatically to the second stage, where hides are fat-liquored. In the third stage, heat is applied to drive off solvent which is recovered and returned to tanks for re-use.

Passage of a single side of hide takes only a few minutes. Process is said to yield leathers of exceptional beauty and utility that open the door to new design, fashion, and merchandising possibilities in shoe production.

(Secotan machine is being offered internationally under license by Proctor and Schwartz, Inc., 700 Tabor Road, Philadelphia 20, Pa.)

Check 5090 opposite last page.

One million roentgens/hr obtained in lab-size irradiation chamber

Compact, laboratory irradiation device is available, which can provide dose rates of over one million roentgens per hour. Using a cobalt-60 source, the complete unit weighs 7000 lb and occupies 16 sq ft of floor space. Its height is 76".

The irradiation chamber itself is only 6" diam x 7-⅞" high. A pushbutton control moves the chamber into the exposure position. Chamber is automatically returned from the irradiate position after a a pre-set time. Access tubes to the chamber permit irradiation of liquids or gases or use of electrical leads.

(Further information about Gammacell-220 irradiator may be obtained from Atomic Energy of Canada Ltd., Commercial Products Div., P.O. Box 93, Ottawa, Canada.)

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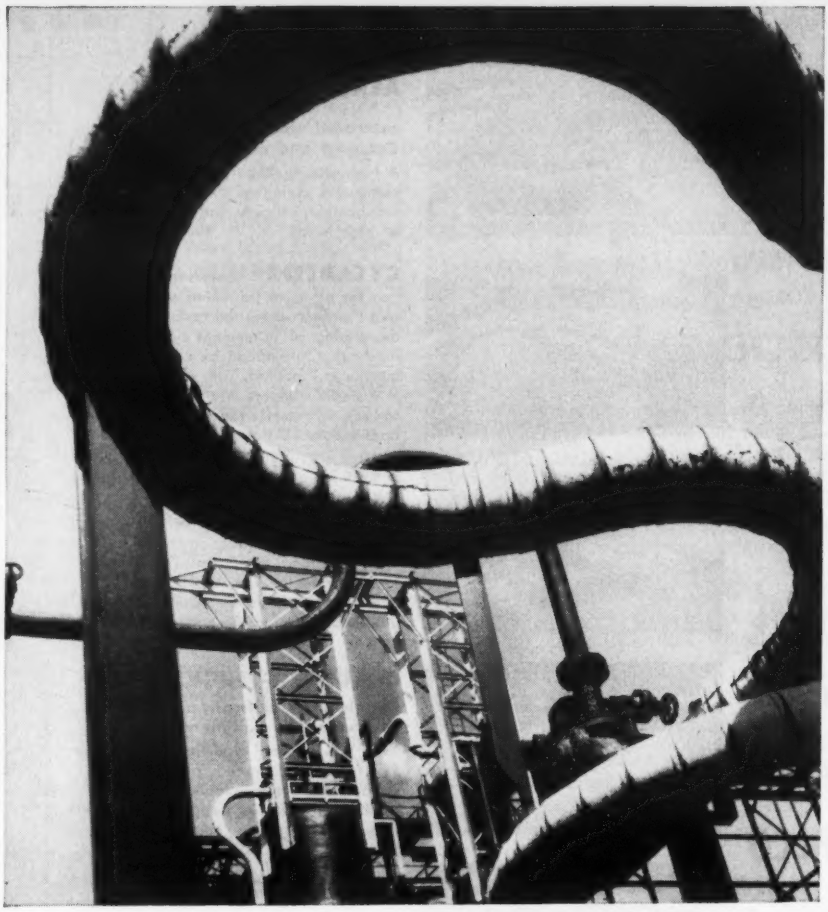


Kraft paper pulping operations have their own odor characteristics. Even their "sour cabbage" smell has been effectively controlled with Airkem.

Airkem installations are simple to operate and low in cost. No change is required in process or plant construction.

Petroleum Industry mixes molecules to end community relations problem

A new form of molecular mixture is the petroleum industry's answer to the old problem of odorous gaseous wastes. The solution is in blending Airkem odor counteractant molecules with the odor molecules leaving the refinery site. Odor counteractants developed through fifteen years in basic odor research are projected into the air by means of a calibrated atomizing nozzle. Through molecular dispersion, the Airkem counteractant follows the course of the odorous airstream and neutralizes its unpleasant effect. This simple and economical approach to odor control quickly establishes better community relations wherever it is installed.

Kraft pulp industry odor problems are also complex. However, Airkem odor control chemists and field engineers have found the solution to this problem as well. In the United States and other parts of the world Airkem odor counteractants have removed the stigma of obnoxious odors from kraft pulp mills without requiring changes in process or plant design.

Is your process odorous? Airkem maintains the most extensive odor research laboratory in the world, as well as an international organization of trained field representatives to help solve your problems. If your company has a problem with odors from petroleum wastes, kraft pulping, fertilizer processing, paint baking, or any other industrial process, why not ask Airkem for help?

Write for information today.

airkem
Specialists in Odor Control

AIRKEM, INC. CP-58
241 East 44th Street, New York 17, N. Y.

Please send me information on industrial odor control.

My problem is _____

Name _____

Position _____

Company _____

Address _____

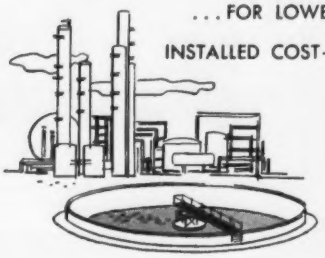
City _____ Zone ____ State _____

Check 5092 opposite last page

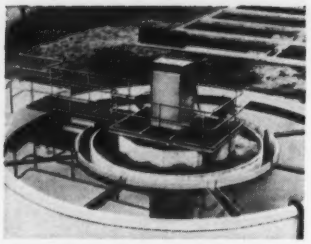
IN THE MINIMUM SPACE

. . . FOR LOWER

INSTALLED COST—

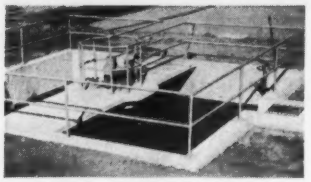


. . . YOU get highest performance and greatest economy with INFILCO waste treatment equipment



AERO-ACCELATOR
(TRADE MARK)
activated sludge plant. Compact and efficient.
A high-rate, multi-purpose unit for rapid, continuous biological oxidation and clarification; efficient and stable operation at high loads. BULLETIN 6510

CYCLATOR® clarifier
. . . for effective treatment of industrial waste waters where the concentration and dewatering of voluminous sludges are involved. Clarification by chemical and mechanical methods with solids recirculation in a single compact unit. Three types of surface skimmers available for different applications. BULLETIN 850



VORTI® Mixers
Efficient vortex flow pattern, reduced power consumption.
Provide turbulent agitation by controlled multi-directional circulation. For round, square or rectangular equalization, reaction or flocculation basins. Simple, trouble-free design; no underwater bearings. BULLETIN 700

CLARIFIER-THICKENERS
For simple clarification or thickening by sedimentation.
Type WS for small diameters, Types BF or PDR for large diameters. Three types of surface skimmers available for different applications. Special designs for sludge thickening. BULLETIN 800/6000

SEDIFLOTOR®
clarifiers enable both sedimentation and flotation in one compact unit
Where space is limited and clarification a must, this air flotation unit is ideal for removal of both flotable materials and settleable solids. BULLETIN 6051

CHEMICAL FEEDERS
Full variety with many exclusive features available.
Lime slakers, dry, solution and slurry-feed types, available for either constant or variable-rate operation.
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INFILCO

INFILCO KNOWS HOW to help you control pollution, water reclamation and materials loss problems.

No other line of waste treatment equipment is so complete as INFILCO's—none so advanced in method and design. There are many other units in addition to typical examples illustrated above.
INFILCO engineers know how to help solve your waste-water disposal problems with knowledge gained from many years of specialized experience in industrial waste treatment. Write today for bulletins of interest to you. Inquiries are invited on all waste-water treatment problems.

THE ONLY COMPANY impartially offering equipment for ALL types of water and waste processing—coagulation, precipitation, sedimentation, flotation, filtration, ion exchange and biological treatment.

Check 5093 opposite last page

Solid high-energy fuel, super rocket engines, joint undertaking

Super-efficient rocket engines are being developed using solid high-energy fuel in a joint undertaking of Thiokol Chemical Corporation of Trenton, N. J., and Callery Chemical Company of Callery, Pa. Under terms of the working arrangement, Callery, developer of HiCal, high-energy boron-base liquid fuel, is producing the fuel, and Thiokol, pioneer producer of case-bonded, solid-propellant rockets, builds the engines.

Callery's role in the development project is to provide HiCal in solid form and to work with Thiokol scientists in effecting a successful combination of compounds which can be utilized in Thiokol's case-bonded rocket engine design. Development of more advanced solid oxidizers to further enhance characteristics of this new solid fuel is another part of the joint effort.

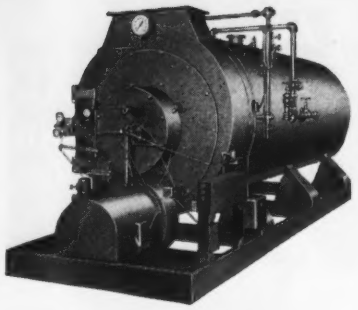
When a rocket is fired utilizing the new solid fuel, it will burn on all of the exposed inner surface of a specially shaped propellant cavity. Since burning will occur from the inside outward, the flame will not contact the walls of the pressure vessel. Consequently, both the weight of the rocket and the size of its fuel section can be substantially reduced.

(Further information about boron chemicals may be obtained from Callery Chemical Company, Callery, Pa.)

Company safety program assures peace of mind of radiation workers

Take own exposure readings with pocket dosimeters

Safety records at Standard Oil Company of California's research labs and petroleum refineries indicate that radiation workers get less exposure than other employees, thanks to an extensive safety and monitoring program. Precautions, such as taking only one



Here's CYCLOTHERM'S 3-WAY CUT in STEAM PROCESSING COSTS!

If you process by steam, use steam by Cyclotherm. You cut costs in these three vital ways:

FUEL COSTS

Cyclotherm Cyclonic Combustion means just what it says—controlled fuel and air, whirling at 200 mph, forming a cyclone in the furnace! This high velocity burning assures maximum efficiency in combustion and heat transfer, resulting in lower fuel consumption.

MANPOWER COSTS

A fire without a fireman! Electronic controls operate the Cyclotherm safely and automatically. Smaller models cycle on and off as steam is required. On larger models, precision modulation coordinates the fuel-air ratio to the load demand, from 30% to 100% of rated capacity.

INSTALLATION AND MAINTENANCE COSTS

Cyclotherm is factory assembled and factory pre-tested. All you do is make five simple connections. 50% maintenance savings are not uncommon. Return tubes cleaned in minutes with no removal or replacement of refractories. No standby unit needed.

And remember—one-third smaller than ordinary generators of similar capacity, a Cyclotherm fits almost anywhere. Many plants have installed two Cyclotherms for utmost flexibility and power. Burns gas or oil with quick changeover. 18 to 500 hp, 15 to 200 psi.

YEARS AHEAD IN STEAM GENERATION
CYCLOTHERM®
STEAM AND HOT WATER GENERATORS

Cyclotherm Division,
National-U. S. Radiator Corp.
61 E. First St., Oswego, N. Y.

Please send me a free copy of your booklet giving full information on Cyclotherm Steam and Hot Water Generators.

Name.....
Company.....
Address.....
City.....Zone.....State.....

Check 5094 opposite last page

yearly dental X-ray schedule instead of two, and photographic instead of fluoroscopic chest X-rays, are also some of the factors that account for this. Savings made in milliroentgens are considered to more than pay the way in the laboratory program.

Peace of mind of radiation workers is assured by providing them with pocket dosimeters. Workers use these instruments to take their own exposure readings, rather than using films or meters that have to be read by someone else. By the use of these self-reading meters, a big psychological advantage is obtained.

Each man records the initial and final readings of the dosimeter and the increments each day. Once a month, the safety engineer makes a photostatic copy of the entries in each individual's notebook, thus providing company with permanent record of each employee's exposure in his own handwriting. Possible internal contamination is checked by periodic counts of urine samples. Periodic blood counts are not considered necessary.

(Based on paper presented by D. E. Hull, California Research Corporation of the Standard Oil Company of California, Richmond, California at Eighth National Conference on Standards, San Francisco, California.)

"Hang onto this boy. He has a few good ideas on cost saving production methods."

...a spontaneously flammable liquid organoboron compound, useful as a catalytic polymerization agent for ethylenic-vinyl-acrylic monomers—

3

TRIETHYLBORANE

Triethylborane, $(C_2H_5)_3B$, is a colorless liquid, miscible with most organic solvents. Available now in experimental quantities, Triethylborane is a Lewis acid and forms complexes with ammonia and amines.

Spontaneously flammable, its vapors ignite in oxygen at partial pressures below 1 mm. at 0°C. Suggested uses include: as a polymerization catalyst; as an igniter; as a jet fuel or fuel component because of its unusual combustion properties. Other alkyl boranes can be made. If you expect that a particular compound might interest you, we would like to hear from you. For more information on Triethylborane, write for Technical Bulletin C-310.

Phone: FOrest 4-1130 TWX: 117 Perrysville, Pa.

GALLERY CHEMICAL COMPANY
PITTSBURGH 37, PENNSYLVANIA

Check 5095 opposite last page

REDUCE OPERATING COST of VACUUM SYSTEMS with this "AERO" (air-cooled) VAPOR CONDENSER

Niagara Aero Vapor Condenser. This compact machine may be installed directly above stripping column or vacuum evaporator.

With free air the cooling medium you use the least water, evaporated in the air stream. You save the cost and pumping of large volumes of condensing water.

Air-vapor subcooling reduces mixture evacuated from the system, saving in the operation of steam ejector or vacuum pump.

This *air-cooled* condenser gives you more capacity than other types at a substantial saving of steam and power. Water supply, scaling treatment and disposal problems are eliminated.

You get pure condensate, an improved product; often make a profit on recovery of residues now wasted. There can be no contamination of your product at any time; it never touches raw water. Condensing, of water, of solvents or of your product, is simplified; you have one, compact, easily maintained unit replacing both cooling tower and barometric or surface type condenser.

Maintenance expense is low. Balanced Wet Bulb Control provide precise, year 'round adjustment of capacity to load.

Constant temperature, uniform products and maximum production 12 months a year are assured. Unit capacities up to 15 million BTU.

Write for full information. Ask for Bulletin 129R

NIAGARA BLOWER COMPANY
Dept. CP-5, 405 Lexington Ave., New York 17, N.Y.
Niagara District Engineers in Principal Cities of U. S. and Canada

Check 5096 opposite last page

15 SPECIFIC PACKINGS FOR ALL CORROSIVE SERVICES

White asbestos yarn impregnated with Teflon†.
White asbestos yarn externally lubricated with Teflon.
Teflon multi-filament yarn, no lubricant.
Teflon multi-filament yarn lubricated with Fluorolube.
Teflon multi-filament yarn lubricated with Teflon.
Shredded Teflon encased in cotton jacket.
Shredded Teflon encased in Teflon tape jacket.
AAAA asbestos yarn lubricated with Teflon.
Crocidolite blue asbestos yarn surface-lubricated with Teflon.
Crocidolite blue asbestos yarn lubricated throughout with Teflon.
Teflon tape, no lubricant.
Teflon tape impregnated with chemically resistant lubricant.
Teflon tape jacket over Crocidolite blue asbestos impregnated with chemically resistant lubricant.
Teflon tape impregnated with lubricant suitable for nitrating acid service.
Teflon tape lubricated with special non-hardening, non-melting lubricant.

John Crane **CHEMLON** ***BRAIDED PACKINGS**

Specific service conditions are always best handled with a packing designed for the purpose. This is especially true when it comes to the hard-to-handle liquids in the chemical, petrochemical and refinery industries.

For this reason John Crane has developed 15 individual field-proved types of Chemlon Braided Packings. Within this line there is a type and style that will meet any combination of service conditions and requirements.

1. All known industrial acids, alkalis or solvents.
2. Temperatures from −120°F to +600°F.
3. High or low shaft speeds, also valve stems.
4. Longer packing life due to lower coefficient of friction and non-raveling construction.

Send in your service condition and we will recommend a Chemlon Braided Packing best suited to your application. Request Bulletin P-325.

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb).
In Canada: Crane Packing Co., Ltd., Hamilton, Ont.

†*T. M. for DuPont Teflon* **T. M. for the Best in DuPont Teflon*

John Crane — MECHANICAL PACKINGS · SHAFT SEALS · TEFLON PRODUCTS · LAPPING MACHINES · THREAD COMPOUNDS

CRANE PACKING COMPANY

Check 5097 opposite last page

High yields, low costs with fat rendering, drying process

Operates continuously under vacuum at 110-120°F

Important economic advantages are reported for new low-temperature (110-120°F) rendering and drying process for fats, and for producing oleo oils from edible tallow. Big features are low operating costs and high yields at high production rates.

Known as the Carver-Greenfield Rendering and Drying Process, the method gives practically 100% yield of high-grade edible fat. The low-fat, high protein meat by-product is extremely dry and highly stable. Rendered fat has good flavor, odor, stability, and top quality color. Free fatty acid content is low.

Process is continuous with only a few minutes contact time under high vacuum. It is also suitable for other animal-fat raw materials such as back fat with or without skins, leaf lard and other pork fats, sweet pickled fats, and beef suet with or without attached meat.

In pilot equipment rendering beef fats for oleo stock, 100% of the recovered fat has been grained and separated into oleostearine and oleo oil. Economic graining and separation of oleo stock with consistent recoveries as high as 74% oleo oil from crystallized oleo stock have also been reported.

(Further information about process can be obtained from Chemical Plants Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh, Pa.)

Check 5098 opposite last page.

Management clinic

Publication of 105 pages including charts, forms, and illustrations contains proceedings of 21st Annual Time and Motion Study and Management Clinic sponsored by Industrial Management Society. To obtain proceedings, remit $5 direct to Industrial Management Society, 330 South Wells St., Chicago 6, Illinois.

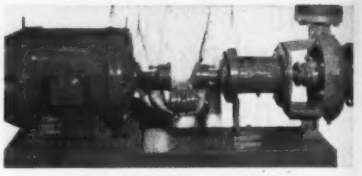
Lovejoy

SPACER TYPE **RRL**

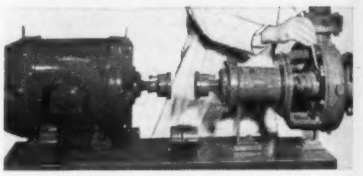
FLEXIBLE COUPLING

Cuts Pump Maintenance Time

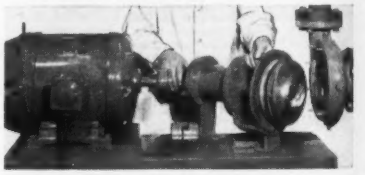
Lovejoy's Spacer Type RRL Flexible Coupling permits the pump to be quickly and easily disconnected from the driving unit without disconnecting the piping. Only two sets of bolts need be removed. Axial movement of shafts is not required. Just three simple steps remove the pump from the line:



Unbolt and remove coupling.



Unbolt back head and cradle combination assembly from casing.



Remove pump for inspection or repair. Line remains intact.

A REAL DOWN-TIME SAVER FOR IN-LINE INSTALLATIONS: Where two pumps operate from one extended shaft motor, Lovejoy Type RRL Spacer Couplings permit independent operation of the pumps. Each pump may be inspected or repaired separately without stopping the motor.

OTHER MAINTENANCE ADVANTAGES: *No lubrication required.* One-piece spider-type cushion visible for inspection at all times. No wear on metal jaws — cushion absorbs load. Available in sizes from 1/20 to 40 hp.

Lovejoy

Request complete information now.

LOVEJOY FLEXIBLE COUPLING CO.

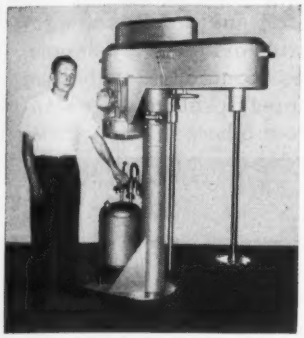
4808 W. Lake St. • Chicago 44, Ill.

Check 5099 opposite last page

(Advertisement)

TWO NEW BIG-VOLUME MIXERS ADDED TO COWLES DISSOLVER LINE

All models efficient for processing wide variety of chemical and similar products



Now Cowles Dissolver models cover a wider volume range than ever, from small laboratory types to the most powerful units on the market.

The new large capacity mixer, Model 510VHV, is designed to bring variable speed to big batch mixing. It enables operation at optimum speeds from 900 to 2100 rpm on a wide variety of products. Unit is powered by a 7-½ or 10 H.P. motor.

Largest-capacity lift-type mixer yet developed is the new model 720VH. Requiring only relatively small space it makes possible the application of 20 to 40 H.P. motors for big volume and high viscosity batches at 900 to 1500 rpm.

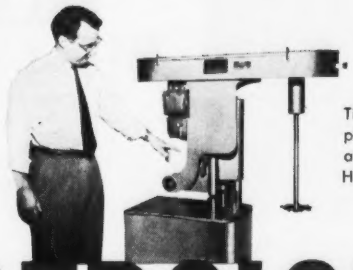
Great versatility of all models is outstanding. They are highly efficient for fast ultimate dispersions in the manufacturing of industrial chemicals, drugs, medicines, pharmaceuticals, cosmetics, cleaning and polishing preparations, waxes, paints, varnishes, lacquers, enamels, fertilizers, insecticides and similar products.

In-plant tests without obligation to buy are offered established firms to provide greater volume at less cost and improved quality. Complete application and engineering assistance for most efficient plant arrangement and operation are also offered.

For complete information about your particular needs address Morehouse-Cowles, Inc., 1150 San Fernando Road, Los Angeles 65, California.

COWLES SETS DISPERSION VOLUME RECORDS

multiplies output per hour, in less space and less time—at less cost



Tip-up type for pilot plants and small production. Highly versatile **5-VT.***

The big-volume and high efficiency records of the Cowles Dissolvers are rapidly making these advanced machines all-around workhorses of chemical production. While the Cowles actually provides up to 20 times faster mixing action—it is simpler to operate, takes less space than conventional equipment. And with records of up to several times the hourly volume of ordinary mixers, it operates with low maintenance requirements—and even lower initial cost. In all models, uniform results in high quality end products are completely proved.

Versatility is unchallenged for gas-liquid, liquid-liquid and solid-liquid applications such as:

ULTIMATE DISPERSION. Breaks material down to ultimate particle size, quickly surrounding each particle with a film of liquid.

EMULSION. Creates fine, extremely stable emulsions of the most difficult types, without pumps, targets or auxiliary equipment.

WASHING & EXTRACTION. Picks up dense materials from tank bottom, imparts intense washing and scrubbing action. Result: shorter and fewer cycles, more efficient use of scrubbing component, better operation of evaporators, filters, etc.

REACTION. Acts efficiently in producing small crystal sizes. More efficient utilization of reactants gives higher yield, particularly in gassing operations. Speeds reactions, simplifies temperature control.

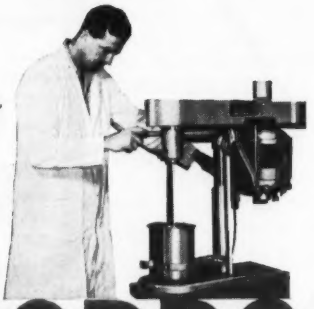
The first with variable speed for big batches. **510-VHV** hydraulic lift unit.*

Key to efficiency: the "Multi-Phase" action of revolutionary Cowles Impeller

This unique, patented impeller takes materials through several action phases not produced by ordinary equipment. Material is thrown off at 60 mph speed from impeller vanes. Particle is thus sheared and smashed against particle in a zone of intense "hydraulic attrition." At the same time, the entire batch is kept in "total motion," returning to the impeller in a controlled cycle. Scientific details on request.

Fastest growing popularity in its field

Cowles "multi-phase" action is setting new production records throughout the industry. Enjoy its benefits now. Let us prove the Cowles in your plant—at our risk. Write or send coupon today for complete details.



For laboratories and pilot runs, **1-VG** gives results identical to large models.*

MOREHOUSE®

Representatives in principal cities
Convenient lease and time payment plans

MOREHOUSE-COWLES, Inc.
1150 San Fernando Rd., Los Angeles 65, Calif.

Please send complete details on the Cowles for production of _____

☐ *Am interested in a trial installation.*

Name _____ Title _____

Firm _____

Address _____

City _____ Zone ____ State _____

5717

**Typical Cowles Dissolvers. Choose from many models.*

Check 5101 opposite last page

DEKORON PRODUCTS CUT INSTRUMENT TUBING COSTS

CORROSION
RESISTANT METAL
INSTRUMENT
LINE HARNESS

DEKORON Metl-Cor®, tried and proven in years of service in literally thousands of installations, is impervious to attack from even the most corrosive industrial atmospheres and weather conditions.

Dekoron Metl-Cor is a multiple tube bundle of copper or aluminum tubes over which is extruded a thick sheath of corrosion-proof plastic. This harnessed construction means that it costs much less to install than ordinary metal tubing because many tubes are installed at one handling. Metl-Cor instrument line harness is available with from 2 to 19 (7 *illustrated*) tubes per bundle, up to 1000 ft. in length.

Corrosion resistance . . . elimination of tubing replacements . . . ease and speed of installation—*no other metal instrument tubing can compare with patented Dekoron Metl-Cor*. Request Bulletin 456 for additional information.

AA-6806

Dekoron® products

quality
research
service

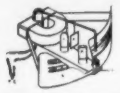
SAMUEL MOORE & COMPANY • MANTUA, OHIO
DEKORON PRODUCTS DIVISION

Check 5102 opposite last page

Gardsman by WEST

TEMPERATURE CONTROLLERS

serve your need Best

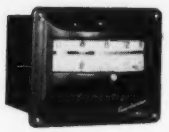


General characteristics: indicating *and* providing positive control; distinctively simple, convenient, reliable, economical; tubeless; plug-in meter units; thermocouple break protected; guaranteed; demonstrated and serviced from offices in many cities here and abroad.

MODEL J SERIES
for **Off-On** control

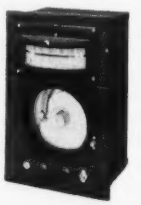
MODEL JP SERIES
for **Proportioning** control; more precise where heating-cooling factors are more dynamic

MODEL JL SERIES
combines **High Limit** and **Off-on** control

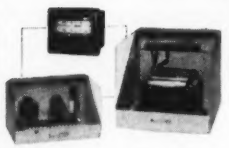


MODEL JE SERIES
Portable—ideal for laboratories

MODEL JG SERIES
provides **Program** control, applying any of above control actions to control both time and temperature.



MODEL JS SERIES
gives **Step-less** control; **extremely precise**



MODEL JT SERIES
gives **3-Position** control for motorized valves, 3-phase heating, heating-cooling cycles

✦ All controllers can be furnished for thermocouples or resistance bulbs. For data on these or other West instruments and accessories, use your classified phone directory or write direct.

the trend is to **WEST** ✦

WEST Instrument CORPORATION
SALES OFFICES IN PRINCIPAL CITIES
4357C W. MONTROSE, CHICAGO 41, ILL.

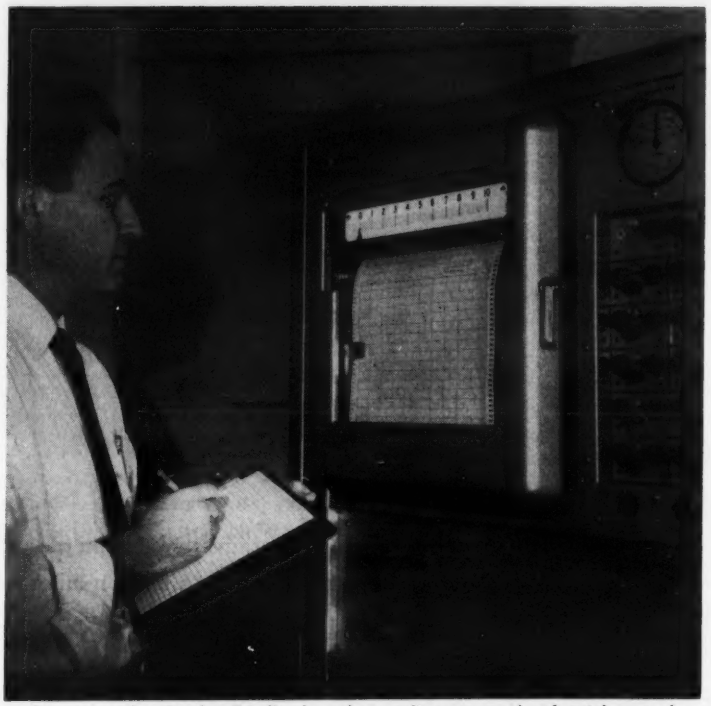
British Plant: WEST INSTRUMENT LTD
52 Regent St., Brighton 1, Sussex
Represented in Canada by Upton Bradeen & James

Check 5103 opposite last page

Here's an example of how a well-integrated laboratory uses X-ray fluorescence spectrography to get precise results fast. With pushbutton control, Chicago Spectro Service Laboratory can run . . .

X-RAY ANALYSES BY THE HUNDREDS — EVERY DAY

WILLIAM C. CLARKE, Assistant Editor
With **ALAN GOLDBLATT,** Director
Chicago Spectro Service Laboratory
Chicago, Illinois



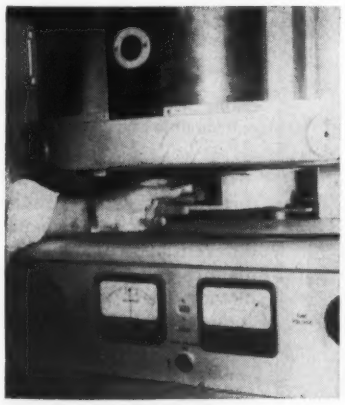
Spectrographer Stanley Friedlander takes reading on sample of stainless steel being analyzed for seven elements. Once the instrument has been "set-up" only a pushbutton action is required to read-out another analysis

Using a well-integrated plan of equipment use, Chicago Spectro Service Laboratory is able to process within 24 hours all samples received for spectrochemical analysis. Qualitative and quantitative results on several hundred samples a day are obtained — easily and with high accuracy.

A major tool in Spectro Service's versatile installation is a direct-reading X-ray fluorescence spectrograph, called a Quantometer. Used mostly for detection and measurement of elements above atomic number 20 in the periodic table, the instrument has been found to be flexible and fast, two characteristics needed for consulting work.

Typical Problems

Of the many applications of the Quantometer at Spectro Service, only a few can be mentioned. All types of stainless steels have been analyzed, as well as nickel-base and other high-temperature and corrosion-resistant alloys. Also, ores from many sources have been checked. So-called "difficult" analyses have been handled. These include bromine in sea water, silver in photographic emulsions, lead in steel, trace elements in agricultural products. Feed stocks to catalytic reactors have been analyzed on a ppm level for catalyst "poisons."



Placing the sample in position for analysis under the X-ray tube. The opening is closed during use

How Does It Fit into the Laboratory?

The direct-reading X-ray spectrographic analyzer is one of five spectrometers in use at the Laboratory. As is common in most laboratories, Spectro Service has a photographic recording unit for rapid scanning of samples. Once the composition range of the inorganic sample has been determined, an analysis using the X-ray unit can be planned involving up to seven elements, to be handled on a routine basis.

Operation of the Instrument

Sample preparation requires only that a flat, homogeneous surface be made available. Grinding is usually all that is necessary. Sample is then irradiated in position beneath the X-ray tube, and the reading is taken.

Simultaneous measurements are taken direct by eight Geiger counters. The currents are then integrated, and recorded automatically.

In actual operation, one detector receives radiation which acts as a control. This radiation can be from the sample being analyzed or from a reference standard. Output of this tube is also integrated and recorded during the exposure.

Once the standard output reaches a predetermined value, the instrument initiates an automatic sequencing of measurements for recording purposes. Each integrator is connected in turn to the amplifier and recorder, introducing sensitivity and zero controls at the same time. Thus the intensity of each channel is presented as a ratio to the internal standard.

X-ray Spectrograph as a Tool

Chicago Spectro Service has been able to give one-day analysis service on 800 to 900 determinations a day with aid of the instrument. Received from clients all over the United States, the samples cover a wide range of products, among them being all the stainless steels and many low alloy steels. The Laboratory is even now investigating the analysis of samples in powder or liquid form which would require special sample holders and techniques.

(Quantometer X-ray spectrograph is a product of Applied Research Laboratories, 3717 Park Place, Glendale 8, California)

Check 5104 opposite last page.

(Information on X-ray analyses is available from Chicago Spectro Service Laboratory, Inc., 2454 W. 38th St., Chicago 32, Illinois.)

Check 5105 opposite last page.

Polypropylene ware...another NALGE first

New plastic makes Nalge Lab-ware even more practical

NALGE maintains its position of leadership by being the first to fashion laboratory ware from polypropylene . . . the latest development in the field of plastic chemistry.

This amazing new plastic has a wide range of properties that are remarkably suitable for lab use. Harder, more rigid, with greater heat resistance (320° F or 160° C) and transparency, NALGENE [PR] (polypropylene) means more useful, *unbreakable* equipment. And you'll like the handsome, *pleasant-to-handle* quality of NALGENE [PR] laboratory ware!

1201 [PR] Beakers
30-50-100-150-250-400-600-1000 ml

1210 [PR] Centrifuge Tubes
Conical, 15 ml

1210-1 [PR] Centrifuge and Test Tubes
75x12, 100x13, 100x16, 105x29, 115x15, 115x19, 162x32 mm

1224 [PR] Graduated Cylinder
25, 50, 100, 250, 500, 1000 ml

1226 [PR] Pharmaceutical Graduates
Double scale:
4 oz./125 ml;
8 oz./250 ml;
16 oz./500 ml;
32 oz./1000 ml

Now in stock at your suppliers . . . ask to see it

Your supplier will gladly furnish you with our new catalog G-358 which completely details all Nalge plastic laboratory supplies.

the NALGE CO. Inc.
ROCHESTER 2, NEW YORK

WORLD'S LARGEST PRODUCER OF POLYETHYLENE LABORATORY WARE

Check 5106 opposite last page

Gamma-ray report

Technical report of 15 pages concerns generation of gamma rays (Bremsstrahlung) for radiation chemistry research and commercial radiation processing. Report will be useful in planning radiation research programs in laboratories, and in investigating the technical and economic feasibility of high-energy radiation processing itself. Report AM-100 — Applied Radiation Corp., Walnut Creek, Calif.

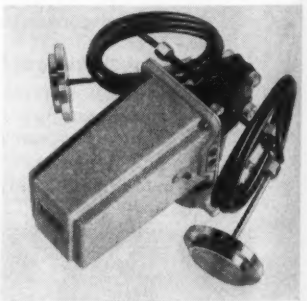
Check 5107 opposite last page.

Liquid level system for hard-to-handle fluids and 'jells'

Equally effective on slurries and suspensions

Uses: Making difficult flow and liquid level measurements, including corrosive fluids, liquids that "jell" when not in motion, colloidal suspensions and slurries.

Features: Flow and liquid level transmitter is a standard instrument which completely eliminates a variety of costly special installations.



Two sensing elements of level transmitter for "difficult" fluids

Description: Volumetric differential-pressure transmitter has two sensing elements, and differential-pressure sensing diaphragm. Entire system is factory-filled with silicone compound and permanently sealed.

Two sensing unit assemblies are available. One mounts flush inside of chemical tee for pipe installation. Another mounts on a standard 3-inch

flange. Temperature limit is 300°F at sensing diaphragm. Pressure limit of instrument is 1500 psi.

Sensing elements directly contact fluid in pipe or tank at two points and relay pressure differential to secondary portion. Pressure differential is converted to a 3-15 psi pneumatic output signal for a suitable receiver or controller. Simple controls include range and zero adjustment, effective damping against pulsations and vibrations. Instrument has overrange protection.

(205T volumetric pressure transmitter is product of Taylor Instrument Companies, 95 Ames Street, Rochester 1, New York.)

Check 5108 opposite last page.

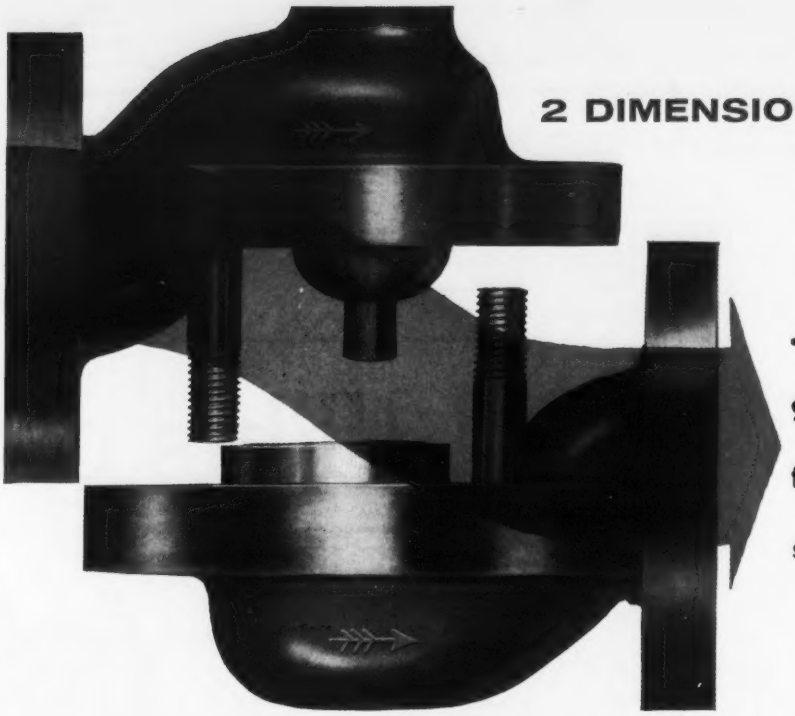
Speed indicator info

Advantages of speed indication are discussed in manufacturer's 12-page booklet which describes and illustrates various models of speed indicators and tachometers. Of special interest is a series of line drawings, with dimensions, showing ways in which speed indicators may be installed in various applications. Booklet 58 — Jones Motrola Corp., 432 Fairfield Ave., Stamford, Conn.

Check 5109 opposite last page.

" — A pinch of permanganate, a dash of hydrochloric, and simmer for about an hour."

Cartoon submitted by James V. Redding, Central Pharmacal Co., Seymour, Ind.



2 DIMENSIONS . . . C_v and f. to f.

. . . that mean greater savings and flexibility with K&M split-body valves

The "dollar dimension" of a valve is the C_v; flow capacity, rather than the nominal size.

K&M split body valves have higher C_v's than any other split-body design. This was achieved by generous internal dimensioning, well-engineered contouring and quality-controlled manufacture.

The accompanying table of C_v's was not arrived at by estimate, calculation or optimism. K&M's larger flow ratings are certified by actual hydraulic laboratory tests.

. . . And you can start using this greater capacity on existing installations because of another important dimension . . . face-to-face.

K&M is the only split body valve conforming to I.S.A. face-to-face standards, (150, 300, 600 psi).

These K&M valves can, therefore, be interchanged with any standard diaphragm valve in your plant.

Here's money saving for your valve inventory budget . . . and essential flexibility for your plant.

The same body can be field-converted into any one of 432 different valve assemblies . . . in a matter of minutes . . . and without removing the valve from the line.

Write for Bulletin 132 which completely describes the valve which has been "dimensioned" to save you money.

COMPARISON OF FLOW CAPACITIES (C_v)

Valve Size	K&M	Valve B	Valve C
½	5.7	4.0	3.0
¾	7.0	6.0	5.0
1	14.0	12.0	9.0
1½	31.5	25.0	24.0
2	49.5	46.0	38.0
3	121.5	110.0	96.0
4	197.0	195.0	150.0
6	405.0	400.0	—
8	645.0	640.0	—

K&M diaphragm control valves

Our 79th Year

KIELEY & MUELLER, INCORPORATED

Oldest Pressure and Level Control Valve Manufacturer

64 Genung Street, Middletown, New York

I.S.A. 1958

Check 5110 opposite last page

Lab high-vacuum pump is clean and quiet

Two-stage unit develops absolute pressure of 0.1μ

Uses: As laboratory high vacuum pump.

Features: Mechanical laboratory high vacuum pump is clean and quiet. Manufacturer guarantees absolute pressure of 0.1 micron with 2-stage unit and 30 microns with single stage.

Description: Noise in high vacuum pump is eliminated by insulation and rubber mounting. Vertical design eliminates operator hazard of conventional belt and pulley. Unit has carrying handle on top for portability.

Vertical design makes pumps leak-proof. With visible oil level cup, spillage by user is at a minimum. In filling pump, oil is not introduced at point of discharge.

Free air displacement is 50 liters per minute. Efficient operation for long periods is possible because of cooler running temperatures.

(ASCO-VAC 10 Series of mechanical high vacuum pump is product of Arthur F. Smith Co., 311 Alexander St., Rochester 4, N. Y.)

Check 5111 opposite last page.

Package density system works without contact with material

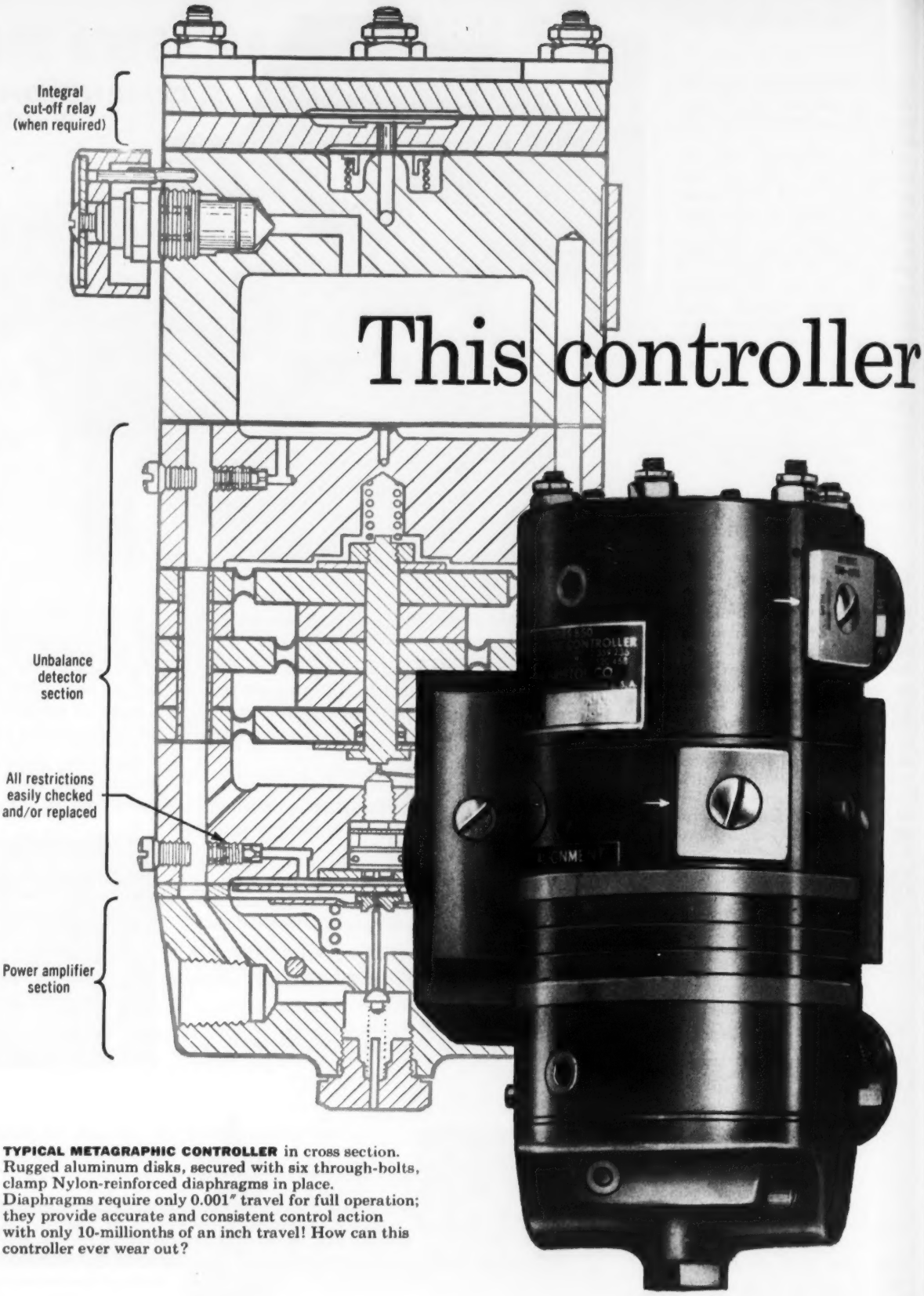
Measures and controls liquids; divided solids

Uses: Measuring and controlling fluid density, specific gravity, percent solids, or related quantities. Can be used on liquids, slurries, and flaked, granulated, or other divided solids.

Features: Packaged density measurement system has no physical contact with flowing material. Measurements are independent of flow rate and pressure.

Description: Based on use of gamma ray transmission from a radioisotope, system is furnished as a complete, integrated unit. Depending upon

This controller


Integral cut-off relay (when required)
Unbalance detector section
All restrictions easily checked and/or replaced
Power amplifier section

TYPICAL METAGRAPHIC CONTROLLER in cross section. Rugged aluminum disks, secured with six through-bolts, clamp Nylon-reinforced diaphragms in place. Diaphragms require only 0.001" travel for full operation; they provide accurate and consistent control action with only 10-millionths of an inch travel! How can this controller ever wear out?

FIVE MODES OF CONTROL

1 Fixed High-Gain (on-off)
2 Adjustable Gain Proportional
3 Proportional-plus-Reset
4 Fixed-Proportional plus Fast-Reset
5 Proportional-plus-Reset-plus-Derivative

Heat . . . rain . . . snow . . . ice . . .
overpressures . . . years of use . . .

r stays on the job!

Operates from "universal" 3-15 psi pneumatic input signal . . . supplies precision pneumatic control of almost any variable

If your process needs a tough boss, here it is.

The Bristol Metagraphic Pneumatic Controller can take all the abuse either environment or process can hand out and still keep right on working. Its bolted, stack-type construction gives it practically the same durability as a solid metal cylinder. Its proved force-balance operating mechanism provides the most sensitive control in process handling, yet withstands overpressures of 100 psi on any connection. And check these features:

36 models to choose from.

Full plug-in service, where desired—With no loss of air pressure or disturbance to the indicating-recording action.

No bearings, no links, no levers—Operation is virtually motionless and frictionless.

High sensitivity—Only 0.01% change in input pressure produces measurable output change.

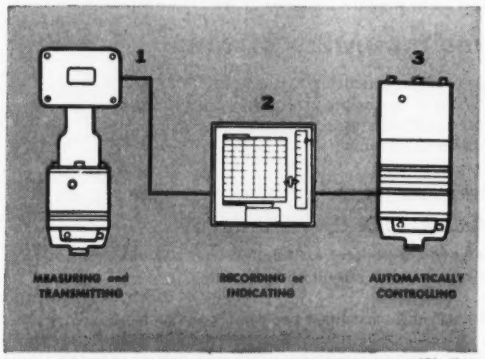
Wide ambient temperature limits—From −65° F to +225° F.

High output capacity—Up to 3 scfm on pipe connected models.

Low air consumption—Only 0.2 scfm when balanced.

Write for complete data on the Bristol Metagraphic Pneumatic Controller today. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn. 7.50

FULL PLUG-IN FLEXIBILITY for receiver mounting or field mounting allows one-minute controller substitution with no disturbance to recording or indication.



HOW BRISTOL METAGRAPHIC CONTROLLER (3) fits into complete system. Controller may be located directly at controlled process or conveniently plugged into receiver (2).

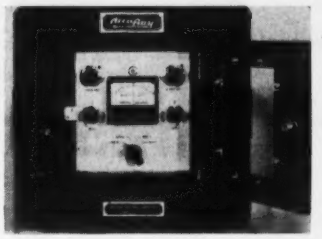
BRISTOL *TRAIL-BLAZERS IN PROCESS AUTOMATION*

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 5112 opposite last page

process and material measured, long term accuracies of ±0.001 to ±0.003 specific gravity units are obtainable. Systems with greater sensitivity can also be had.

Built-in standardizing circuits maintain accuracy and



Density control panel may be located remote from measuring head

calibration. Automatic built-in compensation for changes due to temperature is also available.

System is constructed of corrosion-resistant meehanite castings welded on pipe. Pipe sizes from 3 to 8 in are standard. Control unit may be located hundreds of feet from measuring head.

(AccuRay Density System is product of Industrial Nucleonics Corporation, 1205 Chesapeake Ave., Columbus 12, O.)

Check 5113 opposite last page.

Venturi info

Engineering bulletin of 32 pages describes various types of Venturi tubes, their recovery characteristics, formulas that determine design, typical calculations, and similar data. Bul 110-P1—Builders-Providence, Inc., div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R. I.

Check 5114 opposite last page.

Particle size analyzer 'reads' most dusts

Measures distribution between 0.1 and 40μ

Uses: As general purpose instrument for measuring size distribution of small particles.

Features: Particle size ana-

To page 131

INSTALLING LIQUID LEVEL GAGES

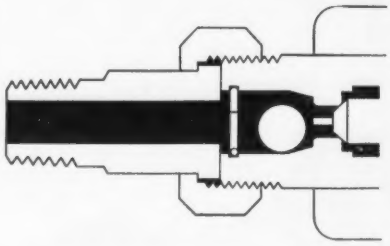
Penberthy "FLOATING SHANK"

lines up off-center holes

Center-to-center variations of vessel tappings or gage assembly can cause costly, inaccurate mounting.

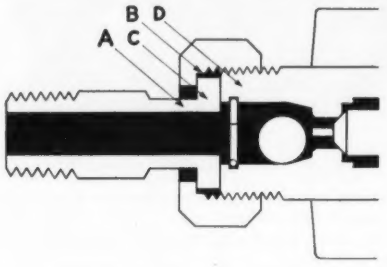
STANDARD SHANK

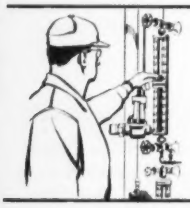
Minimum tolerance between union nut, nipple, and nipple flange prevents *any* corrective movement to compensate for inaccurate tapping. Gage and valve assemblies must either be "force-fitted" or vessel retapped.



FLOATING SHANK

Recessed neck (a) plus wide union opening (b) permit 3/16" movement of flange (c) in ANY direction. Together, "floating shanks" on top and bottom gage valves compensate for off-center tapping errors as high as 3/8". Machined flange (c) assures TIGHT metal-to-metal union with valve body (d).

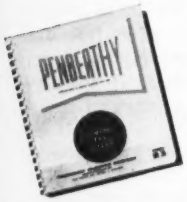




...eliminates mounting strains

By permitting freedom of movement up to 3/8" in ANY direction, Penberthy "floating shank" principle protects against mounting stresses . . . allows gage and valve assemblies to seek TRUE center-to-center position between inaccurately tapped holes.

AN EXCLUSIVE EXTRA AT NO EXTRA COST



- cuts installation time and replacement costs by 50%
- provides true gage and valve alignment on incorrectly tapped vessels
- eliminates "force-fitting" and subsequent strains on gage and valve assemblies
- prevents possible damage to entire installation
- reduces unnecessary glass breakage due to gage distortion

WRITE for Catalog 36 showing complete line of liquid level gages and valves, Standard or special assemblies available through local suppliers or direct.

PENBERTHY MANUFACTURING COMPANY *Division of Buffalo-Eclipse Corporation*
1242 Holden Avenue Detroit 2, Michigan

Everywhere . . . you're seeing more
PRODUCTS BY PENBERTHY

EJECTORS
INJECTORS
CYCLING JET PUMPS
LIQUID LEVEL GAGES
GAGE VALVES
SUMP PUMPS

Check 5115 opposite last page

MINIMITE® Portable Pyrometer Indicator is Accurate, Versatile

NULL BALANCE, POTENTIOMETER TYPE

The "MiniMite" Portable Pyrometer Indicator gives you laboratory accuracy—in a rugged, versatile instrument. You can use it dependably for a wide range of temperature measurement, calibration and test purposes. Carry it around and set it up wherever you need it. Heavy use won't impair its performance or accuracy.

Temperature Measurement

When connected to a thermocouple the "MiniMite" will measure temperature directly. Use it for laboratory work, emergency operation, or as a substitute for instruments under repair. It's also ideal for a wide variety of research and test work. Automatic cold-junction compensation is built-in.

Calibration

You can use the "MiniMite" to calibrate thermocouples—also both potentiometer and millivoltmeter-type instruments. For calibrating millivoltmeters, the "MiniMite" is used with a variable voltage source to enable direct calibration comparisons between the two instruments.

Scale Range

Despite the "MiniMite's" small size, individual ranges on its double-range scale are almost 24" long. A choice of 49 different range combinations covers temperatures from —300°F. to +3200°F. for Copper-Constantan, Iron-Constantan, Chromel-Alumel and Platinum-Rhodium-Platinum—and millivolts from —6.2 to +62. Accuracy is ¼ of 1% of scale range.

Convenience

The "MiniMite" measures only 4" x 5" x 6" and weighs under 4 lbs. It will function in either horizontal or vertical position. Widely spaced graduations permit easy, accurate readings. Cold-junction compensation can be cut in or out by a single switch.

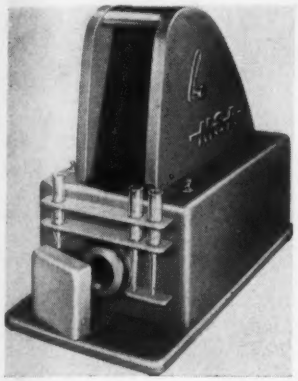
Write For Bulletin 64-R.

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY

In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

Check 5116 opposite last page

lyzer was designed for particles between approximately 0.1 and 40 microns which includes most airborne dusts, paint pigments, and many chemicals and pharmaceuticals.



Magnified image of sediment column on projector screen indicates particle size

Description: Major units of this analyzer system are special centrifuge tubes and a tube feeding chamber, an optical tube projector, and one or more special centrifuges. Three centrifuges provide constant speeds of 300 rpm, 600-1200 rpm, and 1800 rpm for predetermined times. A magnified image of the sediment column in a centrifuge tube is measured on a graduated optical projection screen.

Basic steps in analysis are preparation of a suspension of particles, transfer of suspension to a feeding chamber, and then into a centrifuge tube. Sediment height is read before and after centrifuging at predetermined times and speeds. Size distribution is determined from height data.

(Particle size analyzer is product of Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh, Pa.)

Check 5117 opposite last page.

Describes ovens

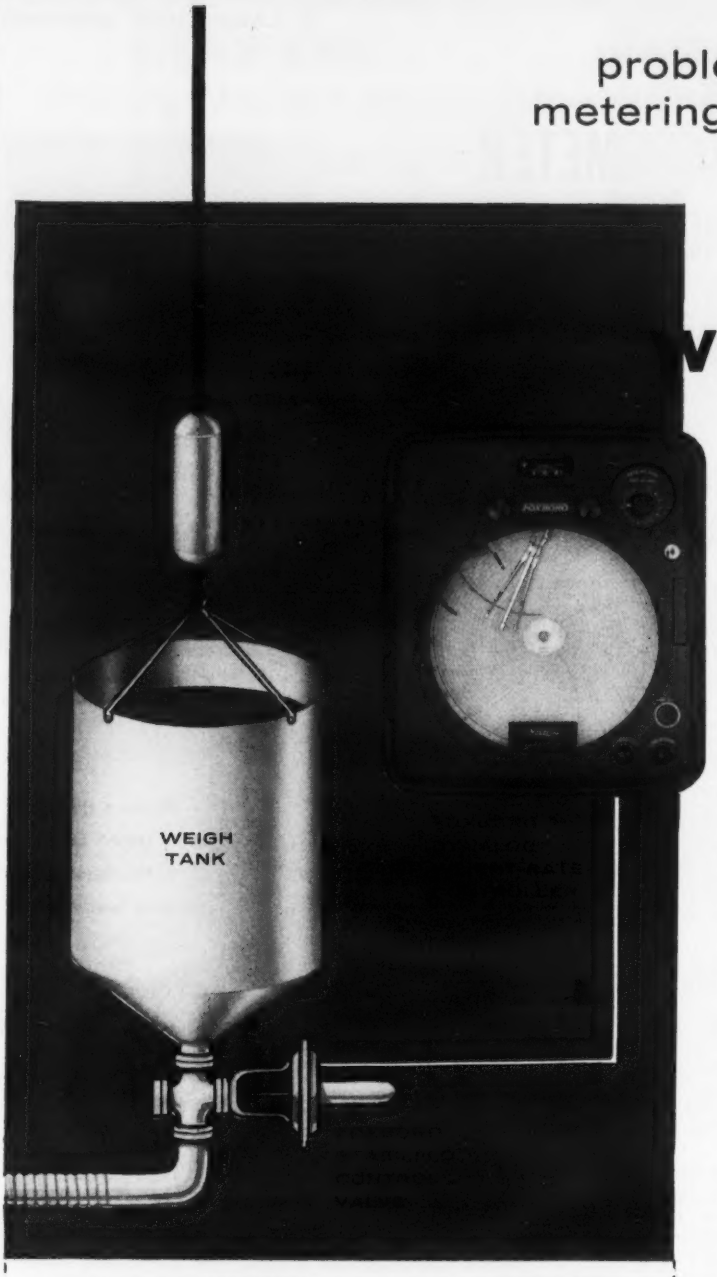
Illustrated bulletin of four pages describes lab size ovens, furnaces, and refrigerated baths. Bul 5720 — Blue M Electric Co., 138th & Chatham St., Blue Island, Ill.

Check 5118 opposite last page.

problem of
metering "tricky" liquids
eliminated!

Foxboro WEIGHT-RATE SYSTEM

accurately controls flow rate of any liquid that will pass through a pipe



HOW IT WORKS The Foxboro Weight-Rate Flow Control System controls weight of liquid passing from a weigh tank suspended from a load cell (either hydraulic or strain gauge-type). Cell continuously measures decreasing weight of liquid. Controller records weight, controls time of draining, and sends pneumatic control signal to a Foxboro Stabilflo Valve installed in drain line. After correct amount of liquid is taken from tank in the desired time, controller automatically closes valve.

Here's a Foxboro batch control system designed especially for liquids that undergo wide fluctuations of density, temperature, or viscosity. Small volumes, corrosive liquids — even liquids that stick to the side of a tank will not affect the system's accuracy.

The Foxboro Weight-Rate System controls flow rate by weight of liquid rather than by volume. Functions of a load cell; a Dynalog* electronic recorder; and a Cyclelog* pneumatic controller are coordinated to do this.

Operation is simple. You merely set weight of liquid, dial the desired time, and push a button. The automatic control system does the rest, while keeping an accurate record of the whole process.

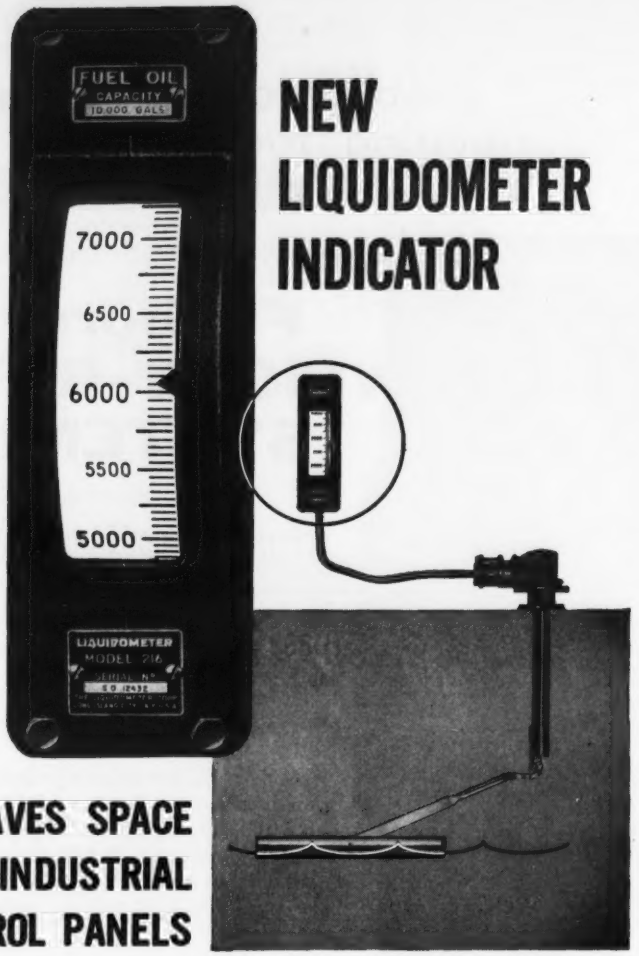
Best of all, the Foxboro Weight-Rate System requires practically no maintenance. That's because neither the measuring element nor the controller ever come in contact with the process liquid.

If batch operations with "tricky" chemicals are your problem, Foxboro has the answer. Call your local Foxboro Field Engineer for full details, or write The Foxboro Company, 815 Neponset Ave., Foxboro, Mass.

*Reg. U.S. Pat. Off.

FOXBORO REG. U.S. PAT. OFF. FLOW CONTROL SYSTEMS

Check 5119 opposite last page



NEW LIQUIDOMETER INDICATOR

SAVES SPACE ON INDUSTRIAL CONTROL PANELS

Twenty-inch dial in 3x10¼" case permits close readings

The new Liquidometer Model 216 Indicator gives the plant engineer a reliable, automatic reading of storage tank contents. Available in either vertical or horizontal design, the compact and highly readable Model 216 Indicator makes possible multiple installations on crowded control panels.

Teamed with Liquidometer's time-tested hydraulic transmission gaging system, the new indicator provides instantaneous remote indication of liquid levels—automatically. No outside power source is required. Virtually any liquid may be measured, and the indicator can be located up to 250 feet from the tank.

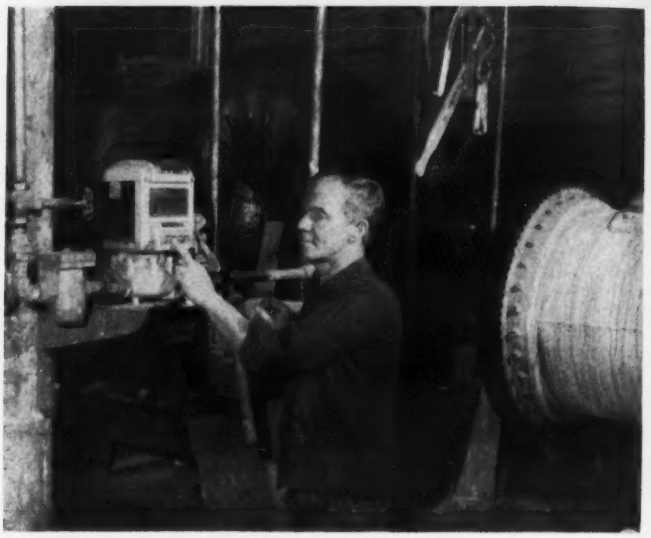
Engineered for dependability, the Liquidometer gaging systems highlight these design features:

- Maintenance free
- Integral temperature compensation
- Ease of installation—requires only one 2" diameter tank opening
- Safety—all gages Underwriters approved for hazardous liquids

For further details on the new Model 216 Indicator, write Dept. D.

THE LIQUIDOMETER CORP.
SKILLMAN AVENUE AT 36th STREET
LONG ISLAND CITY 1, NEW YORK

Check 5120 opposite last page



Controlled viscosity, resulting from exact addition of water, results with pushing buttons on bottom of automatic liquid batching meter

'To get a close color match week after week, every pound of basic stain must contain precisely the same amounts of color pigments.' Viscosity was used as a control. Water was one of the ingredients.

Automatic batching meter controls viscosity to within one percent

Problem: Uniform viscosities are absolutely essential in controlling hues of finished colors in making wallpaper at The Birge Co., Inc., Buffalo, New York. Precisely measured quantities of hot water, temperature 125°F, are added to ball mills grinding basic colors and pigments. Colors may be milled for three to twelve hours per batch, being mixed with clay, latex, and many other ingredients. Water is added to convert milled mass into a homogenous, somewhat viscous liquid.

Calibrated pails have been and still are used in industry for an amazingly large variety of liquid measuring work. However, use of pails takes quite a bit of time and certainly, a great deal of labor. A batch requiring up to 500 pounds of water would require 15 to 20 minutes of steady ladling. Occasional miscounts mean that batches might come out too thick or too thin. Adjustment would necessarily require hand-addition of water or ingredients to make formula needed.

Additional disadvantage of use of pails was that pails could become dented, throwing off the calibration.

Although inaccuracies were never allowed to get through to the finished product, the cost of adjusting inaccuracies

was considered an unjustifiable expense.

Solution: Birge installed a one-inch automatic-stop liquid batching meter. Instrument automatically shuts itself off when the right amount of water has been added to the batch.

Under this system, operator simply presses buttons on meter register, setting quantity needed. Meter valve is then opened and water is added to batch.

Results: Pigment viscosity is automatically controlled within 1%. Installation of the meter not only saves time and labor of introducing water but also saves time and fuss of adjusting batches. A second test to certify accuracy of the adjustment has become unnecessary. Batches now check out correctly the first time.

(Auto-Stop Meter is product of Neptune Meter Company, 19 West 50th Street, New York 20, New York.)

Check 5121 opposite last page.

Solion energy transducer

Operating principle, characteristics, applications, and proposed circuit components of a solion energy transducer being commercially developed are contained in manufacturer's four-page bulletin. This electronic device may replace the transistor at frequencies below 100 cycles per second. Form EP-1001 — National Carbon Co., Div. of Union Carbide Corporation, 30 East 42nd St., New York 17, N. Y.

Check 5122 opposite last page.

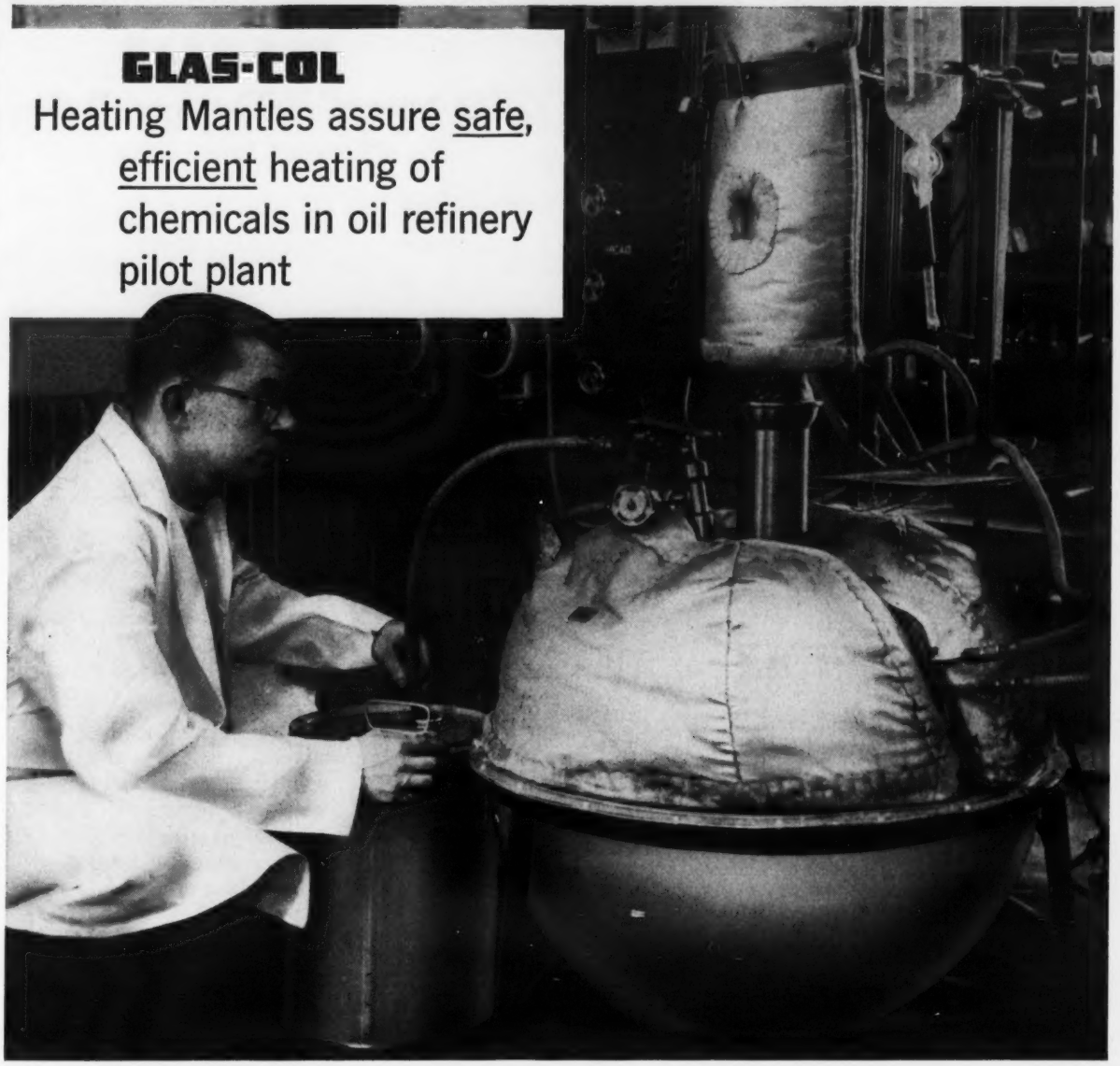
Infrared analyses

Illustrated four-pager features low-cost, double-beam spectrophotometer for routine infrared analyses. List of literature covering spectrophotometry, pH-electrochemical, and gas chromatography is included. "Infrared Notes" Vol 3, No. 2 — Scientific Instruments Div., Beckman Instruments Inc., 2500 Fullerton Road, Fullerton, Calif.

Check 5123 opposite last page.

GLAS-COL

Heating Mantles assure safe, efficient heating of chemicals in oil refinery pilot plant



These Glas-Col flask and fractionating column heating mantles assure both safe and efficient heating of chemicals in this 10-gallon Mark II fractionator used in the pilot plant of a well-known oil refinery.

Here are some of the advantages that make Glas-Col heating mantles a must for pilot plant applications:

Safety . . . Glas-Col pilot plant heating mantles are safe . . . they're designed so there's no air chamber beneath the flask where explosive vapors can accumulate if the liquid being heated boils over. There are no open flames or dangerously exposed wires.

Rugged . . . Glas-Col pilot plant heating mantles are made of "R" fabric, a newly developed, extra tough material which is extremely rugged and readily withstands heavy and punishing pilot plant usage.

Zone heating . . . Power input for flask mantles is divided into four circuits. Lowest circuit covers small area at bottom of receptacle being heated. The other three circuits provide heat for succeeding bands up the wall of the receptacle. As liquid level recedes, power to upper circuits can be decreased or shut off. This feature eliminates (1) superheating of vapors, (2) damage of heat-sensitive liquids by splashing against superheated flask wall, and (3) cracks or breaks due to relatively cool liquid coming into contact with wall of receptacle.

Glas-Col Apparatus Company, Dept. CP
711 Hulman Street, Terre Haute, Indiana

The world's largest manufacturer of heating mantles

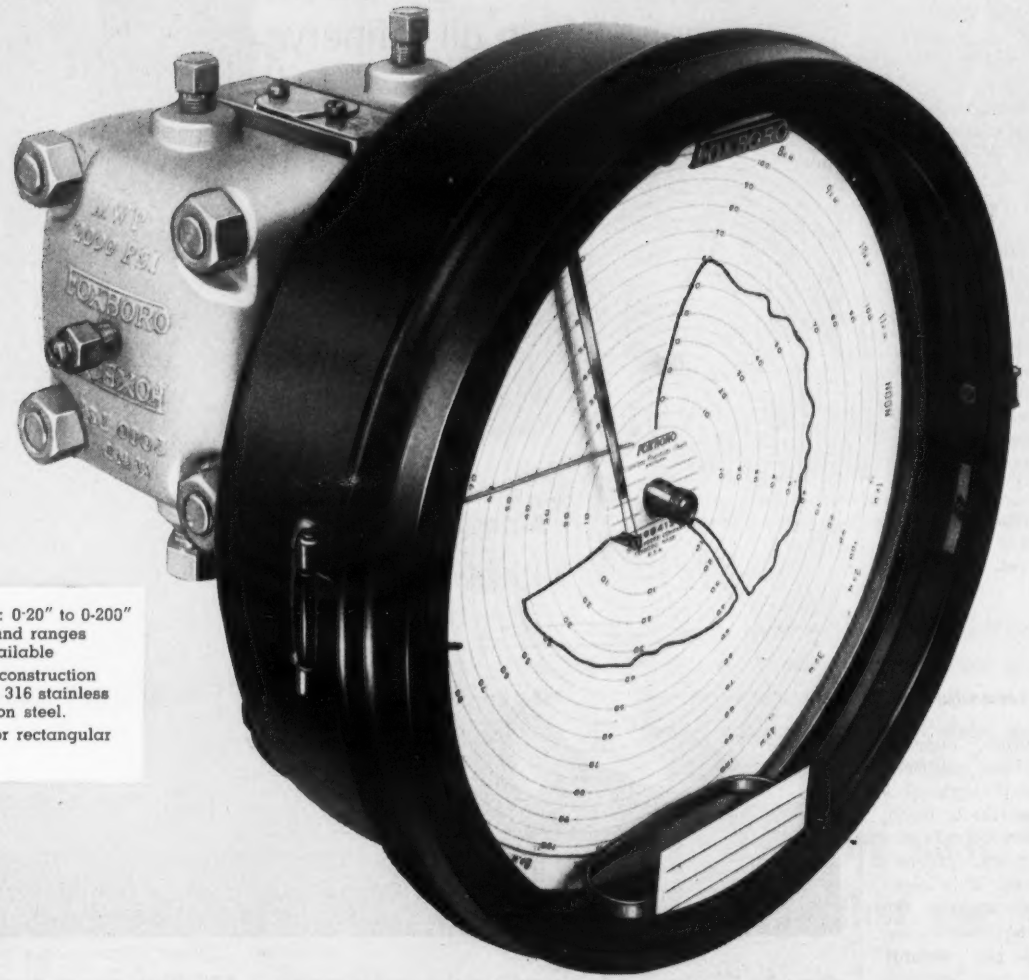
Glas-Col 72-liter heating mantle. Notice connecting cables for mantle's four different circuits.

GLAS-COL Electric Heating Mantles

Trademark Registered U. S. Patent Office — U. S. Patents 2,282,078 2,231,506 2,739,220 2,739,221

Check 5124 opposite last page

NOW... a "Dry" Flow Meter with...

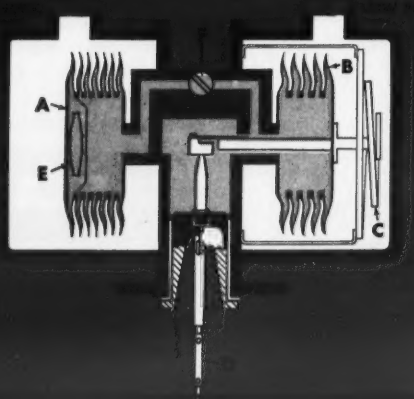


- Ranges: 0-20" to 0-200" Compound ranges also available
- Forged construction in Type 316 stainless or carbon steel.
- Round or rectangular cases.

...the new Foxboro Type 37 Diaphragm Meter

How It Works

In schematic drawing at right, areas shown in color represent a stable, non-freezing liquid. Any pressure increase in the high pressure chamber compresses Diaphragm Unit A, displacing its liquid and expanding Diaphragm Unit B until force of Range Spring C equals the difference between the forces on Diaphragm Units A and B. Linear motion of Diaphragm Unit B moves inner end of Drive Bar D — outer end moves correspondingly through the bellows-sealed flexure bar, driving pen arm. Built in Temperature Compensator (E) proportionately adjusts diaphragm capacity as ambient temperature variations affect volume of filling fluid. External damping adjustment is shown at F.



•complete overrange protection!

•sustained high accuracy!

Now you can have mercuryless flow measurement for a wide range of differential pressures — at static pressures up to 2000 psi — with greater safety and dependability than ever before!

The new Foxboro Type 37 Diaphragm Meter not only combines unmatched ruggedness and precision in a dry meter — it's by far the easiest to adjust and maintain. And it does away with zero drift problems, once and for all!

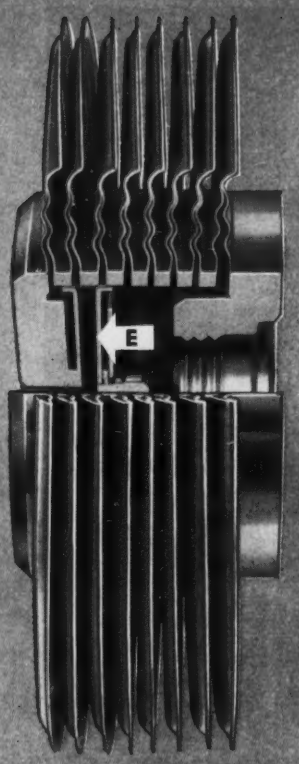
Expansible, Type 316 S.S. diaphragm elements respond to changes in pressure with unmatched sensitivity, yet are completely immune to overrange up to full static pressure! A unique packless drive bar precisely transmits linear motion to the pen arm. Range-changing is easy, due to new twin-spiral spring design. Wide range damping is externally adjustable under pressure. And the Type 37 is self-compensating for temperature changes in all differential ranges.

Get full details on this high utility, completely dependable dry flow meter. Arrange for a demonstration with your nearby Foxboro Field Engineer, or write **The Foxboro Company, 815 Norfolk St., Foxboro, Mass., U.S.A.**

FOXBORO

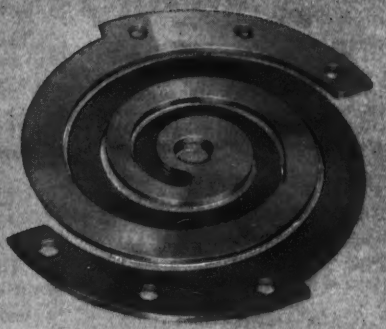
REG. U.S. PAT. OFF.

FIRST IN FLOW METERING



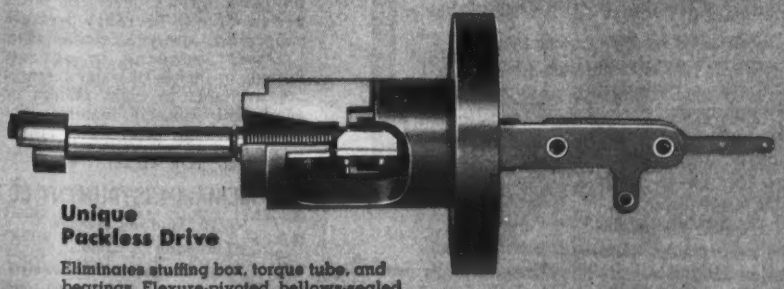
Exclusive Diaphragm Elements

Type 316 S.S. diaphragm units in both high and low pressure chambers provide greatest linearity and freedom from hysteresis; nesting design and integral spacer rings provide safe, positive, overrange protection. Temperature compensation (E) is built into diaphragm assembly . . . never requires change or adjustment.



Exclusive Range Springs

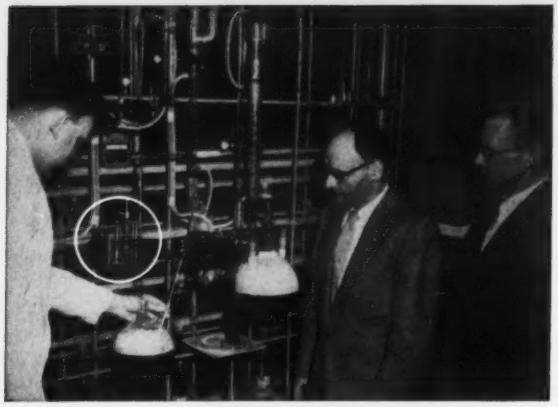
Heavy gauge Ni-Span C alloy, twin-spiral springs provide high sensitivity with lasting accuracy. Readily accessible . . . range changes are easily made, in minutes!



Unique Packless Drive

Eliminates stuffing box, torque tube, and bearings. Flexure-pivoted, bellows-sealed drive bar transmits diaphragm's linear motion to the pen arm with unequalled sensitivity *and undiminished power.* Seal for flexure pivot is a tough, flexible bellows.

For more information on product at left, specify 5125 see information request blank opposite last page.



CORSON-CERVENY MICRO BELLOWS PUMP Meters Sodium Chlorate in Improved Mathieson ClO_2 Process

In the development of this process (which may effect a savings as high as $8000 a year per ton day of gas produced) the Corson-Cerveny Micro Bellows Pump was used to meter sodium chlorate into the laboratory scale generator.

This is but one of many diversified jobs the Micro-Bellows Pump does in research and development laboratories, especially where highly corrosive chemicals are pumped . . . because all parts of the pump in contact with the liquids are made of corrosion-resistant stainless steel.

Write for complete information, and for bulletins on other types of specialized laboratory testing equipment.

RESEARCH APPLIANCE CO.
BOX 307, ALLISON PARK, PA.

Check 5126 opposite last page

TRENT PACKAGED CIRCULATION HEATERS

for Water, Oil, Brine, Air and Various Gases

- Water—Superheat
- Oil, Oil Burners, Heat Transfer Liquids
- Brine, Defrost Applications
- Air, to High Temperatures—Test Work
- Gases, Hydrogen, Nitrogen, etc.

The unique design of TRENT "Packaged" Circulation Heaters *eliminates* return bends in the heating tubes . . . to assure free, uninterrupted flow of liquid through the heater—at the *exact* velocity you require! This means faster, more efficient heating for all types of process equipment.

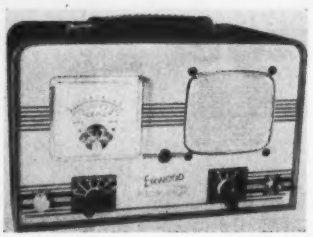
TRENT SOH Oil Circulation Heater
TRENT SWH Water Circulation Heater
furnished fully equipped with

- All-Welded Companion Pipe Assemblies with Insulation
- Indicating or Non-Indicating Thermostats for High Temperatures
- Rugged Outer Casings with Mounting Tabs
- TRENT Multi-Tube Flanged Immersion Heater Unit
- Mounted 6" square Terminal Box

Let a TRENT engineer determine the TRENT "Packaged" Circulation Heater best suited for your operation . . . or custom-engineer one to meet your special wattage and voltage requirements.

TREN INC
Electrically Heated Industrial Equipment
235 LEVERINGTON AVE., PHILA. 27, PA.
In Canada Supreme Power Supplies Limited, Toronto 14

Check 5127 opposite last page



Locating breaks . . .

. . . and stoppages in piping systems underground is one use of this vibration and noise analyzer. Transducer is equipped with an electro magnet in addition to the rod probe for more accurate measurement. Passing probe over ground is often sufficient to detect break.

(Electro-Probe is product of Erwood, Inc., 1770 W. Berteau Ave., Chicago 13, Illinois.)

Check 5127A opposite last pg.

Metering device data

Comprehensive data on design, metering characteristics, flow formulas, capacity and accuracy, installation, accessory items, and similar engineering information on Dall flow tube are contained in 20-page Bul 115-L3C — Builders-Providence, Inc., div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, Rhode Island.

Check 5127B opposite last pg.

Laboratory furnace reaches 3200°F

Operates on any available fuel gas and air

Uses: As laboratory furnace for research and general laboratory work.

Features: Laboratory furnace operates on any available fuel gas and air, reaching 3200°F in only one hour.

Description: Designed originally by manufacturer's ceramic engineers for use in their own research, laboratory furnace has been made available for general laboratory use. Unit will hold 3200°F easily with fuel consumption of only

NEW! "Feather-touch" PUSH-to-TEST PILOT LIGHT

- Completely oil-tight, even when depressed
- Pressure connections eliminate internal wires
- Positive contact "feel" in test position
- No additional panel space required
- Choice of 6 color caps
- Full range of voltage ratings
- Mounts interchangeably with oil-tight pushbuttons and selector switches

Write for Bulletin 9001-T to Square D Company, 4041 North Richards Street, Milwaukee 12, Wis.

NOW... EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Check 5128 opposite last page

HIGHEST ACCURACY . . . LOW COST

MERCURY PRESSURE GAUGES

For any low-pressure air or gas application, Meriam Mercury Pressure Gauges provide *permanent* accuracy and economy.

Recalibration or checking is never required. No gears, diaphragms, springs, levers or pivots are involved. Mercury pressure gauges are always accurate.

Direct reading in ounces, pounds or inches of water...ranges are available to eight pounds or equivalent. Special features provide overrange protection.

WRITE FOR BULLETIN P-10

THE MERIAM INSTRUMENT CO.
10920 Madison Avenue
Cleveland 2, Ohio

Pressure and Vacuum Gauges, Liquid Level Gauges and Flowmeters

S.A. 1736

Check 5129 opposite last page

160,000 Btu per hour. Charge space is 4½ inches diameter by 2¾ inches.

Where larger samples must be heated but lower temperatures are satisfactory, furnace can be transformed by removal of single element to a 2800°F unit with room for a four-inch diameter by five-inch charge.

Overall size is 14-inch diameter by 19 inches high, including legs for bench mounting. A model also available is a floor-mounted design.

Fuel gas used can be natural, manufactured, mixed, or LP.

(LAByrinth furnace is product of Selas Corporation of America, Dresher, Pa.)

Check 5130 opposite last page.

Thermometer catalog

Manufacturer's catalog contains all pertinent engineering data about industrial thermometers, such as case and socket dimensions, as well as a complete set of standard temperature ranges and scale divisions. Cat 125A — Weksler Thermometer Corporation, 195 East Merrick Road, Freeport, L. I., N. Y.

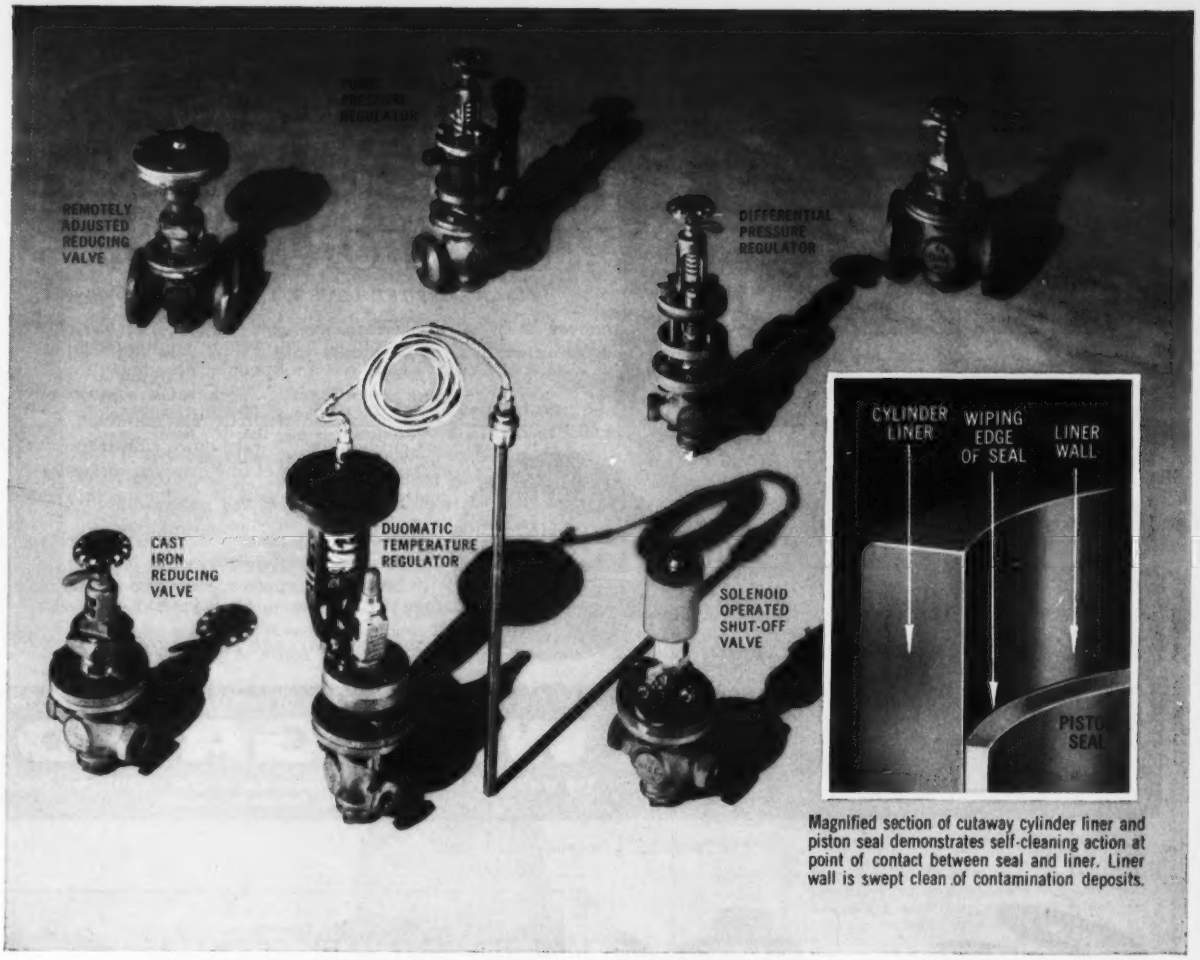
Check 5131 opposite last page.

Miniature annunciator . . .

. . .using static switching circuit with no moving parts has extremely long life due to absence of mechanical or electrical failure. Small size permits many alarm stations to be provided in fraction of space formerly required. Unit can be operated from conventional AC or DC power sources.

(Scammit alarm system is product of The Scam Instrument Corp., 1811 W. Irving Park Road, Chicago 13, Ill.)

Check 5132 opposite last page.



Magnified section of cutaway cylinder liner and piston seal demonstrates self-cleaning action at point of contact between seal and liner. Liner wall is swept clean of contamination deposits.

. . . another LESLIE Quality First!

REGULATORS WITH SELF-CLEANING PISTONS

. . . at no extra cost

Now it can be told! After 3 years of exhaustive field tests and over 5,000 installations, Leslie announces the standardization of exclusive self-cleaning, pressure sealing pistons for reducing valves, temperature and pressure regulators in ½ to 6" sizes — another Leslie FIRST!

Continuous Wiping Action

The continuous "wiper" action of the new piston's seal keeps the cylinder liner clean, improves reliability, reduces maintenance.

The molded self-lubricating piston seal has already proved itself in high temperature service up to 500°F.

Reduces Wear and Sticking

The resilient cushion between the piston and cylinder liner reduces wear and eliminates "freezing" or sticking of these parts. The self-lubrication and pressure-sealing of the new piston insures smooth, dependable operation even in the toughest applications and where long standby periods are a problem with ordinary regulators.

Fully Interchangeable in Field

You can have this desirable new Leslie FIRST in *any* piston-operated Leslie regulator now in steam service for all temperatures up to 500°F. A quick conversion kit is available and your present Leslie Regulator can have the new seal added in a matter of minutes.

More Information

More data is available — send for these aids without obligation.

Data Sheet RV-51C — Instructions for converting your present Leslie Regulator to self-cleaning piston type
Bulletin 5302-B — Reducing Valves and Pressure Regulators
Bulletin 5307-A — Temperature Regulators

Or ask to see a demonstration model of the new pressure seal piston.

LESLIE REGULATORS and CONTROLLERS

LESLIE CO., 281 Grant Avenue, Lyndhurst, New Jersey

Check 5133 opposite last page

New!

PROTECTION + COMFORT THE ALL-NEW WIL-GARD SOFT-LINED LATEX GLOVE

Real comfort in an acid-resistant natural latex glove! This Wil-Gard has a soft, cotton fiber lining that reduces hand perspiration . . . permits fast, easy on-and-off . . . yet provides maximum flexibility and sensitivity. Curved fingers prevent binding . . . turn-down cuffs trap running liquids . . . thousands of tiny gripping surfaces provide a surer, safer grip. Write for specifications.

WIL-GARD

NOW 6 QUALITY LINES . . . 1 DEPENDABLE SOURCE

COMPAR PLASTIC	BUNA-N
NATURAL RUBBER	SOFT-LINED NATURAL LATEX
NEOPRENE	UNLINED NATURAL LATEX

Sold only through Distributors

WR-158-18B

PROTECTION FOR THE HANDS OF INDUSTRY • SINCE 1916 ®

WIL-GARD

THE WILSON RUBBER COMPANY • INDUSTRIAL DIVISION • CANTON 6, OHIO

A Division of Becton, Dickinson and Company

Check 5134 opposite last page

NEW HIGH CAPACITY 3-WAY AIR-PILOT VALVE

Bellows "EPV" Sets New Performance Standards for Small Valves

FREE-FLOW CAPACITY OF 5.4 CFM AT 100 PSI

CHOICE OF 115, 230, 440, OR 12 V. SOLENOIDS

PORT SIZE ....1/8" ORIFICE .....1/16"	MAX. AIR PRESSURE 120 PSI	OPTIONAL PORT FOR MANIFOLD MOUNTING

The EPV's size and capacity make it highly versatile. It is equally rugged and dependable. Solenoid coils are "potted," providing almost 100% freedom from vibration damage. Coils are designed for continuous duty at speeds as high as 600 cycles per min. Moving parts which lie in the air stream are of stainless steel to resist corrosion.

Bulletin EPV-30 Gives Full Information

Address Dept. CP558

1079A

The Bellows Co.

AKRON 9, OHIO

Check 5135 opposite last page

for uniform results in . . . **BAKING DRYING CURING DEHYDRATING**

select

YOUNG BROTHERS OVENS and DRYERS

designed and built for individual product and process requirements

Batch and Conveyor Types up to 1000° F

Gas, Electric, Steam, Oil — Radio Frequency Power

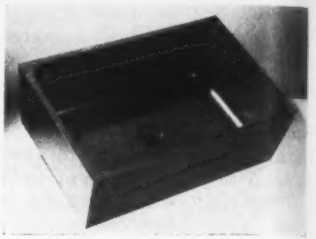
Write for Bulletin 157

YOUNG BROTHERS CO.

1825 Columbus Road • Cleveland 13, Ohio

Over 60 years of service

Check 5136 opposite last page



Laboratory sinks . . .

. . . of modified epoxy resins for severe corrosive services have dished bottoms and curved corners. Sinks are solid castings and can be subjected to considerable mechanical shock.

Material is resistant to hydrofluoric acid, fluosilicic acid, and others.

(Laboratory sinks are products of The Duriron Company, Inc., 450 N. Findlay, Dayton 1, Ohio.)

Check 5137 opposite last page.

Easy analysis

Bulletin of 16 pages introduces machine for continuous stream monitoring. Analyses can be made by colorimeter, conductance bridge, flame spectrometer, or thermometer. "Automation Brought to Analytical Chemistry" — Technicon Instruments Corporation, Chauncey, N. Y.

Check 5138 opposite last page.

FOR MORE INFORMATION

Here's what to do when you want additional details about products and services mentioned in this issue's editorial articles or advertisements.

Note the number at end of article or advertisement. Check this key number on Reader Service slip opposite last page of this issue. Fill in slip with the other pertinent information (name, title, company, address, product made). Mail to our Reader Service Department.

We'll contact the manufacturer for you. He'll send you the details direct.

Temperature hi-lo alarm gives 'close' control

Sensitivity is ±0.30°F over 500°F range

Uses: Providing close temperature control for processes where temperature is critical. Can be used for controlling refrigerators, blast coolers, other constant temperature areas where precise temperature control is desirable.

Features: Temperature alarm has sensitivity of ±0.3°F.

Description: Hi-lo and AC-failure temperature alarm has green light to indicate temperature is within proper range. If below, red signal lights and warning buzzer sounds. If above, both red signals light and warning buzzer sounds. If current fails, battery-operated buzzer sounds.

Alarm is in small metal box easily mounted on wall or panel. Temperature setting is made at factory and can be ordered at any range between −30°F and +550°F.

(Hi-lo and AC-failure temperature alarm is product of Philadelphia Scientific Glass Co., R.D. #1, Paleton Road, Box 46C, Quakertown, Pa.)

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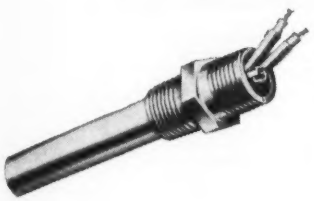


Corrosion-resistant . . .

. . . thermostat has been developed to provide both resistance to corrosion and higher temperature control. Temperature ranges are from −100 to +600°F, and are field adjustable. Contacts are NO or NC. Type 316 stainless is used.

(Corrosion-resistant thermostats are product of Fenwal Inc., Pleasant St., Ashland, Massachusetts.)

Check 5140 opposite last page.

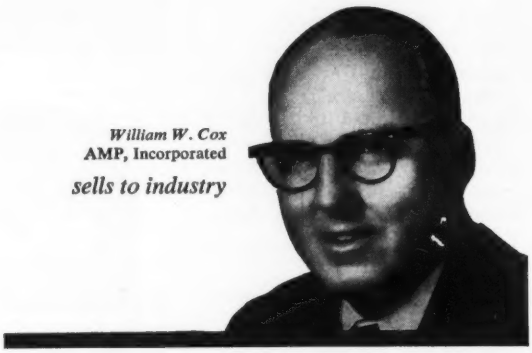
Can specialized business publication advertising actually sell?

By reputation, salesmen are reluctant to credit anything but their own selling efforts for getting names on the dotted line.

Actually, it's quite a different story. The most successful salesmen will tell you two important things about selling. 1. That the selling process is largely a matter of communicating ideas. 2. And that specialized business publication advertising can help importantly to register information with prospects.

Of course each salesman will express this in his own way . . . but they all agree that selling would be far more difficult without the advertising that appears in the industrial, trade, and professional publications that serve the specialized markets to which they sell.

Here, for instance, is what a salesman has to say about this kind of advertising:



William W. Cox
AMP, Incorporated
sells to industry

Says Mr. Cox:

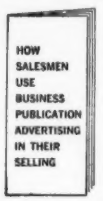
"The quickest way we can introduce a product is by introducing it through advertising in business papers. That way we get it around faster than we can by word of mouth alone. On occasion my home office has inquiries out to me before I can get to the customer or prospect to introduce a new product. They've already seen it in a trade magazine.

"It's interesting to note that within the last two weeks I received a survey which shows about 80% of the new customers we get on our books come through our trade publication advertising. Of course, our company is only 15 years old and we have grown from what you might say, *nothing*, to the biggest in our business. Certainly a lot of that has come from our advertising campaigns. Our name is known throughout the world right now, purely because of our advertising program. When I go to a prospect now, they know my company, they know my product . . . it makes my job easier, and opens doors when I have to make cold calls."

Ask your own salesmen what your company's business publication advertising does for them. If their answers are generally favorable you can be sure that your business publication advertising is really helping them sell. If too many answers are negative it could well pay you to review your advertising objectives—and to make sure the publications that carry your advertising are read by the men who must be sold.

How salesmen use their companies' advertising to get more business

Here's a useful and effective package of ideas for the sales manager, advertising manager or agency man who would like to get more horsepower out of his advertising. Send for a free copy of the pocket size booklet entitled, "How Salesmen Use Advertising in Their Selling," which reports the successful methods employed by eleven salesmen who tell how they get more value out of their companies' advertising.



You'll find represented many interesting variations in how they do this. Some are very ingenious; all are effective. You can be sure that more of your salesmen will use your advertising after they read how others get business through these simple methods.

The coupon is for your convenience in sending for your free copy. Then, if you decide you want to provide your salesmen with additional copies, they are available from NBP Headquarters in Washington, at twenty-five cents each. Or if you choose you can reprint the material yourself and distribute it as widely as you please. But first, send for your free copy.

NATIONAL BUSINESS PUBLICATIONS, INC.
Department 4D
1413 K Street, N. W.
Washington 5, D. C. STerling 3-7533

Please send me a free copy of the NBP booklet "How Salesmen Use Advertising in Their Selling."

Name _____

Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

National Business Publications, Inc.

NBP

. . . each of which serves a specialized market in a specific industry, trade or profession.

variable speeds direct from standard AC power lines ...with

U.S. VARIDRIVE MOTORS

Smooth, stepless speed changes to the split RPM—with the simple, completely self-contained U.S. VARIDRIVE MOTOR! Just plug into any standard AC power line.

Why bother with DC Converter, DC Generators, complicated electronic tubes and circuits that require special technicians? Why risk costly production shutdowns?

You avoid complications when you choose U.S. VARIDRIVE—dependable, simple, easy for ordinary personnel to maintain. Available in RATINGS ¼ TO 60 H.P. Specify: "U.S. VARIDRIVE MOTOR."

U.S. ELECTRICAL MOTORS INC.

P. O. BOX 2058, LOS ANGELES 54, CALIF. OR MILFORD, CONN.

FREE COLOR-ILLUSTRATED BROCHURE ...Send for U.S. Varidrive Bulletin No. 1797

Check 5141 opposite last page

INSTRUMENTS & LAB

Lab vacuum pump is silent, and easily cleaned

Single-stage pump produces vacuum of 50 microns

Uses: As laboratory vacuum pump for applications where a vacuum to 50 microns is adequate.

Features: Vacuum pump is silent-operating and can be easily cleaned in a matter of minutes.

Description: Pump is single-stage, rotary, oil-sealed, high-speed unit. Oil is easily changed. Pump operates at 35 liters per minute to produce the vacuum mentioned.

(Langdon Vacuum Pump is product of Langmar Corporation, 4875 W. Armitage Ave., Chicago 39, Ill.)

Check 5142 opposite last page.

Paper electrophoresis

System for analysis by paper-strip electrophoresis is covered in manufacturer's eight-page catalog. Form SBR-20 — Spinco Div., Beckman Instruments, Inc., Stanford Industrial Park, Palo Alto, Calif.

Check 5143 opposite last page.

Pipe line viscometer can be compensated for temperature

Measures viscosity under actual pressure

Uses: As viscosity measuring element particularly suitable for petroleum and other applications.

Features: Viscometer determines viscosity under actual pressure conditions of system. Instrument can be compensated for temperature.

Description: Instrument operates by establishing a small flow sample through measuring element. Measured viscosity information is electrically transmitted to recorder. Provision is made for installing bulb in system to measure temperature of product as it enters viscosity

ELECTRONICS-TIME

Lumenite

AUTOMATIC CONTROLS

- *ELECTRONIC LIQUID LEVEL*
- *INDUSTRIAL TIMERS*
- *TIME SWITCHES*
- *MAGNETIC SWITCHES*
- *ELECTRONIC SWITCHES*

For Complete Information and Prices on Equipment Needed Write For Any Bulletin Listed Below.

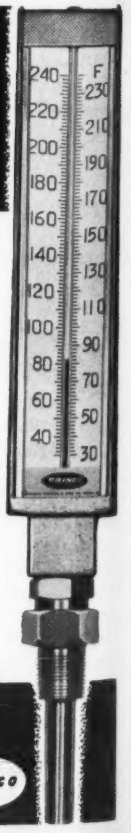
LT—Time Switches FL—Liquid Level ITC—Ice Thickness
PC—Program Clocks FM—Milk Level BH—Boiler Level
CR—Cycle Repeaters FN—Nonconductive Liquid MV—Motorized Sanitary Valves
R—Time Delay Relay RMC—Automatic Reset IT—Interval Timers
LAS—Auto-Lawn Sprinklers LEE—Photo-electronic Relays-Counters, etc.

LUMENITE ELECTRONIC CO.
ENGINEERS • DESIGNERS • MANUFACTURERS
407 South Dearborn Street Chicago 5, Illinois

Check 5144 opposite last page

it's NEW! it's from PRINCO

THE NEW LOOK *in Industrial Thermometers*



PRINCO Industrial Thermometers, long known for their accuracy and rugged durability—are now wearing the most modern case on the market today. The familiar dependable PRINCO characteristics are still evident, for there has been no compromise with quality to bring you this new look.

These new PRINCO Industrial Thermometers feature:

- **Two Piece Individually Calibrated Scale with Tube Recessed Between Them to Prevent Parallax in Readings.**
- **Baked White Enamel Face with Sans-Serif Black Markings for Easy Reading.**
- **Cast Brass Case with Baked Hammertone Finish for Resistance to Industrial Vapors or Sea Atmosphere.**
- **Tapered Bulb Chamber and Tapered Inner Wall of Separable Well Assure Good Thermal Contact and Speed of Response.**
- **Easy Replacement of Glass.**

Available in many ranges within the broad limits of −120 F to +1200 F.

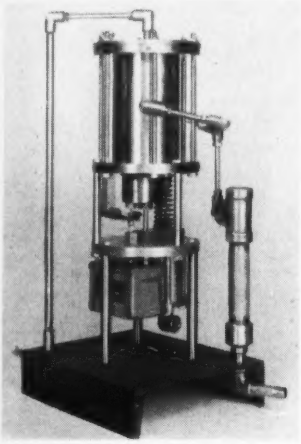
For complete information write for Bulletin F.

PRECISION THERMOMETER AND INSTRUMENT COMPANY
1434 BRANDYWINE STREET, PHILADELPHIA 30, PA. Rittenhouse 6-6671 PRINCO

Check 5145 opposite last page

measuring chamber. Bulb operates a pneumatic transmitter which gives an air signal as function of temperature.

Pneumatic temperature compensation can be readily obtained. A pneumatic transmitter is positioned to provide an air output as a function of viscosity. Air signal from instrument transmitter and air signal from temperature transmitter are both fed to



Viscosity measuring element permits pneumatic temperature compensation of measurements

pneumatic computing relay. Output air pressure of relay is measure of viscosity compensated for temperature. Resulting air signal can be recorded and fed into controller for automatic control purposes.

Heat exchanger can be installed in side stream if necessary to bring temperature within range of compensation.

(Model M12 viscometer measuring element is product of Norcross Corporation, 247 Newtonville Ave., Newton 58, Massachusetts.)

Check 5146 opposite last page.

Lab cabinets

Specifications and features of manufacturer's line of laboratory cabinets are presented in two-page illustrated Bul 170-C — Anetsberger Brothers, Inc., 180 North Anets Dr., Northbrook, Ill.

Check 5147 opposite last page.

Did You Ever Hear of 400-S-2?

400-S-2 is a form which details all metering variables. It gives us the information needed to recommend suitable meters for any liquid used in or around your plant. Write or mail the handy coupon.

If it's a liquid . . . that can be poured or piped

ROCKWELL CAN METER IT!

(Corrosive liquids, too!)

We can't tell you how to make your product, but we can meter it! For that matter we can meter most any liquid used in making or processing your product . . . and to your advantage. With Rockwell industrial meters you can batch, blend and control formulas with precision. You can guard costly inventories, control costs. And with Rockwell automatic quantity control valves you can save time and money on repetitive operations. Find out now about the size and type Rockwell meter that will fit your service needs to a tee. Write or use the handy coupon.

INDUSTRIAL METERS
another fine product by
ROCKWELL

CLIP COUPON—MAIL TODAY

ROCKWELL MANUFACTURING CO.
Pittsburgh 8, Pa.

Gentlemen
I am interested in measuring _____ (Name of Liquid)
Pipe Size _____"
Working Pressure _____psi Temperature _____°F max.
Max. Flow Rate _____gpm Min. Flow Rate _____ gpm
Your Name _____
Company _____
Street _____
City _____ Zone _____ State _____

Check 5148 opposite last page

dispensing flammable and corrosive fluids?

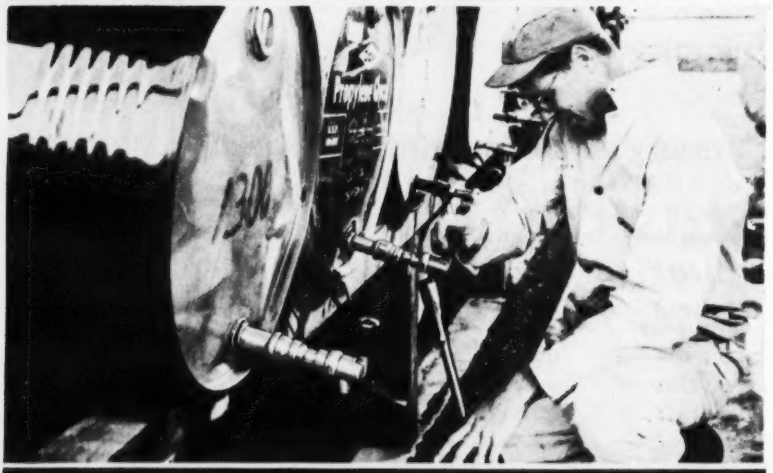
Get Protection Now!

Only Eco offers a stainless steel chemical faucet that is fume-tight and spring-loaded with **TEFLON*** seals. This outstanding design—approved by Factory Mutual—assures you of positive and immediate shutoff . . . . instantaneous full flow. Check your chemical dispensing faucet now and make sure that costly after-drip and leaking are eliminated. Be safe . . . get full efficiency and eliminate maintenance problems now. Write or call your Eco representative, or contact the factory for additional information.

*Teflon—DuPont trademark

- NON-LEAK
- NON-DRIP
- INSTANTANEOUS FULL FLOW
- POSITIVE AND IMMEDIATE SHUT-OFF

APPROVED BY FM FACTORY MUTUAL



ECO ENGINEERING DIVISION
ECONOMY FAUCET CO.

ECO ENGINEERING CO.
12 NEW YORK AVE.
NEWARK 1, N. J.
PHONE: MARKET 4-6565

EXPORT OFFICE
EMPIRE STATE BLDG.
NEW YORK 18, N. Y

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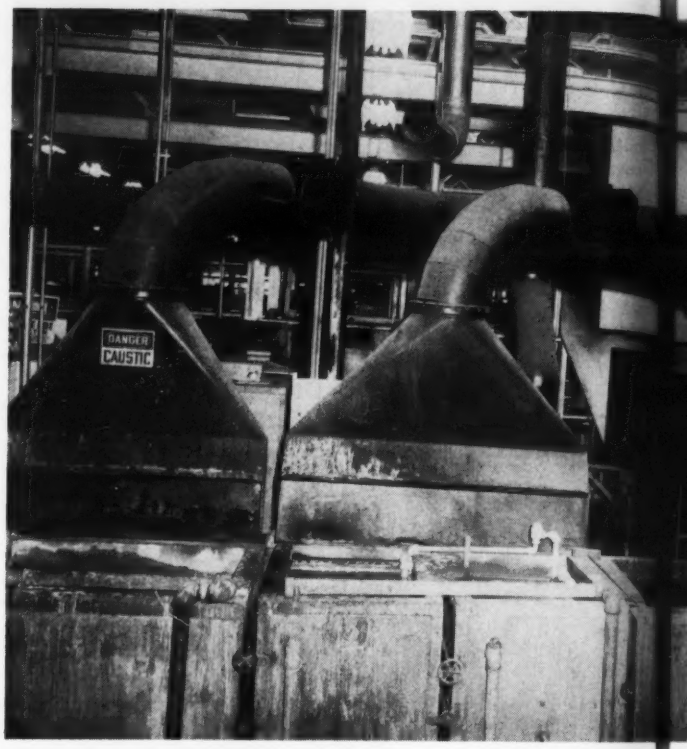


In a pickling and oxidizing process at Acme Steel, modified asphalt-base protective coating on exhaust system duct work . . .

withstands fumes from

THEODORE W. WETT, Assistant Editor
With **NIVEN McCONNELL** Maintenance Engineer
Acme Steel Company, Riverdale, Illinois

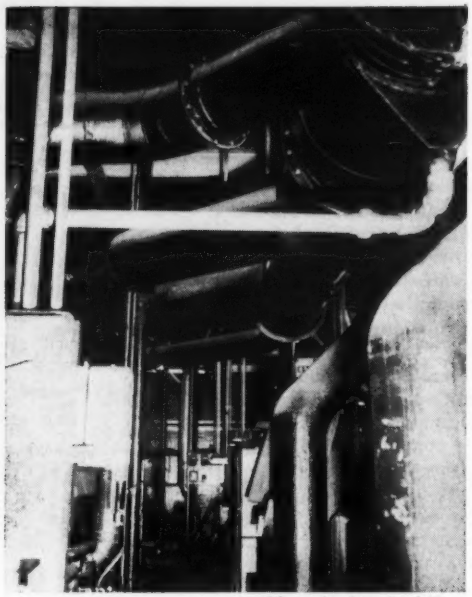
Problem: An exhaust system for "Black Iron" line at Acme Steel Co. had to handle a mixture of acid and caustic fumes as well as hot burner gases.

"Black Iron", an oxide coating given to small steel parts for improved appearance, is produced as follows: Parts are first dipped in a mild solution of nitric acid to obtain a light pickle, then washed. Next they are placed in a solution of KOH, nitrates, and nitrites, called Kwik Blak Salt, at 290°F to produce desired black finish. Parts are washed again and finally given a water soluble wax coating. Heat for solution and wash water is supplied by gas burners under individual tanks. A central exhaust system for all tanks and burner gases was desired.

Solution: Acme employed Kroeschell Engineering to provide exhaust system when line was installed in 1954. Ducting was fabricated from

◀Asphaltic coating on inside and outside of ducts has resisted corrosive caustic and acid fumes for four years

Hot gases and corrosive fumes from various tanks enter single duct system. Both ducts and exhaust fan are protected by asphaltic coating



Photos by Acme Steel News

hot caustic and acid

black steel and given two coats of a modified asphalt-base material, inside and out; one at the shop and one after installation. Applications were made by brushing.

Exhaust is provided by a Bifurcator fan with all surfaces exposed to fumes protected in a similar manner. Direct motor-driven fan has a split housing — motor is mounted in a separate chamber, open to atmosphere but isolated from fumes. Unit is installed as an integral part of duct system without changing direction of air flow or size of duct. It can be mounted in any position.

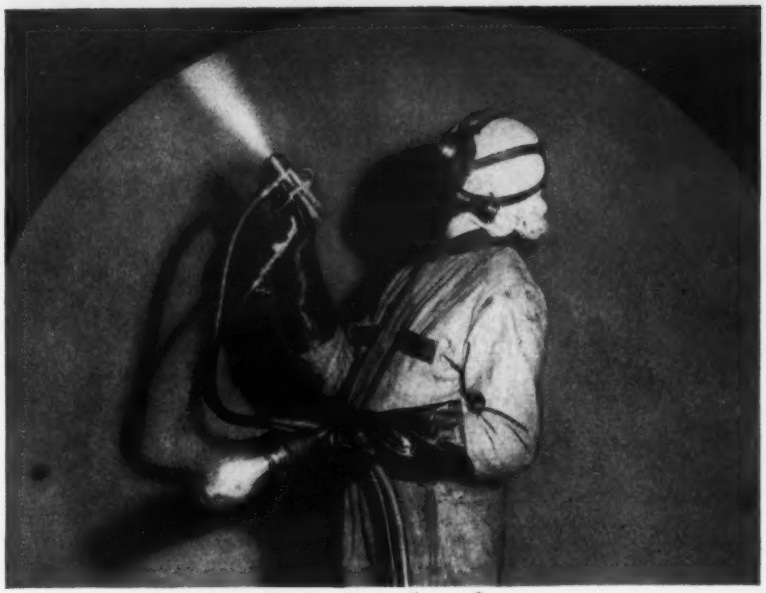
Results: System has been in continuous service since installation, without any need for maintenance. It has successfully handled all fumes and gases to provide a well-ventilated working area.

(Acidon asphalt-base coating is a product of Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11, Ohio.)

Check 5150 opposite last page.

(Bifurcator fan was supplied by DeBothezat Fans Div., of American Machine and Metals, Inc., East Moline, Ill.)

Check 5151 opposite last page.

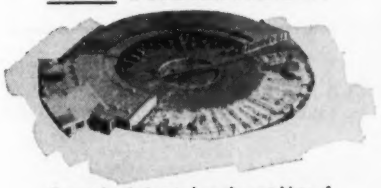


HERE'S HOW LITHCOTE SOLVES CORROSION AND CONTAMINATION PROBLEMS... AT LESS COST!

This happens to be a railroad tank car . . . being Lithcote lined for the safe transportation of formaldehyde. Your corrosion or contamination problem, however, may not involve such large equipment. But whatever the size or shape, Lithcote can provide the lasting protection you want . . . and do it faster with resulting savings for you. We have been doing it some 22 years now.

Our service is not limited to the application of Lithcote linings. We have the experience and the equipment for applying the many name-brands you want, including AMERCOAT, BISONITE, COLUMBIA #7, COPON, PLASITE, UNICHROME, KEL-F. Tell us your requirements!

NEW FACILITIES...



Conveniently located on the outskirts of Chicago at Melrose Park. Fully equipped for custom coating and lining all shapes and sizes of equipment.

NEW CATALOG...

Far more than a "product" bulletin. Lists actual applications in industry of all kinds. Gives complete data on famous *Lithcote* line.

LITHCOTE CORPORATION
5000 W. Lake St., Melrose Park, Ill. • 42 Belden Ave., Norwalk, Conn.
36 W. 44th St., New York 36, N. Y.

Check 5152 opposite last page

IF YOU'RE HANDLING CORROSIVE FLUIDS...

K DUCTILE IRON FITTINGS ARE A MUST!

A nationally known chemical manufacturer reports that Kuhns ductile iron pipe fittings lasted six times longer in raw water lines than ordinary fittings. The brackish water at 80° C. contains 100-2000 parts chloride per million.

They also report excellent results with flanged ductile iron fittings on pumps operating up to 200° C. Other uses reported for Kuhns "DI" fittings include handling oleum at 40° C. to 100° C., steam at 125 psi, steam condensate, nitrogen at 175 psi, carbon dioxide at 150 psi, propane, ammonia, isobutylene, isobutane, and all weak acids.

SAFETY FACTOR

The smooth walls of Kuhns ductile iron fittings, their basic resistance to corrosion, high yield strength of 45,000 psi and excellent thermal shock resistance mean greater plant safety and lower maintenance costs wherever corrosion or volatile fluids are handled.

LISTED BY UNDERWRITERS' LABORATORIES, INC.

"K" Flanges and Flanged Fittings
Elbows, base elbows, 45° elbows, side outlet elbows, tees, side outlet tees, and reducers in straight and reducing sizes. Pressure rating, 500 psi by Underwriters' Laboratories, Inc. Flat faced flanges shipped as standard. Extra heavy flange dimensions and raised faces available on request. Look for the "DI 500" on each. Complete range of sizes through 12".

NOTE: These fittings are excellent for liquefied petroleum gas systems. Look for the "DI 300" on each.

"K" Screwed Fittings* Pressure ratings listed by Underwriters' Laboratories, Inc.

STEAM AND OIL AT 550° F.
¼" to 3" ..... 300 lbs.

LIQUID AND GAS AT 150° F.
¼" to 1" .....2000 lbs.
1¼" to 2" .....1500 lbs.
2½" to 3" .....1000 lbs.

*Ductile Iron fittings are available in any size in Kuhns' complete cast iron line, ¼" through 12".

From the melt in modern electric furnace through to critical inspection, these fittings are made in accordance with A.S.T.M. specifications A-339-55, A-395-55T to provide nodular structure and highest quality to meet industry's strictest requirements.

"K" fittings are available nationally through better wholesalers.

K THE KUHNS BROTHERS CO.
1800 McCall Street • Dayton, Ohio

Check 5153 opposite last page

CORROSION CONTROL

Adjustable packless valve resists corrosion, heat distortion

60% greater closing power, fits into smaller space

Uses: For control of unit conditioners, unit ventilators, and convectors.

Features: Monel spring has a 5 psi range, and may be adjusted to close between 5 to 12 psi top pressure. This enables a single valve to meet variety of conditions. Lower housing of high-impact phenolic eliminates electrolytic corrosion between housing and internal metal parts. It resists heat distortion well over 300°F. Silicone diaphragm is 10 sq in in area, providing 60% greater closing power than previous models. Diaphragm housing, which is 9/16" lower, enables valve to fit into smaller space.

Description: Adjustable packless valve has molded swivel (poppet) and stem guide with two bearing points. These provide perfect alignment in valve seat and tight shut-off. They also prevent valve noise or "chattering" at differential pressures up to 25 psi.

(Adjustable packless valve is product of the Powers Regulator Company, 3434 Oakton St., Skokie, Ill.)

Check 5154 opposite last page.

CORRECTION NOTICE

In the January 1958 issue of CHEMICAL PROCESSING, page 132, we erroneously credited the materials of construction used on the ClO_2 bleaching towers at the Covington, Va., plant of West Virginia Pulp & Paper Co. These materials and the polyvinyl chloride lining labor were supplied by the Atlas Mineral Products Company, Mertztown, Pa.

Another installation referred to in the article, at Tyrone, Pa., used materials furnished by Nukem Products Corporation, Buffalo 20, New York.

The Big 3...

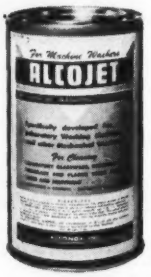
Detergents for Chemical laboratories and chemical plants that

CLEAN *CLEANER* than CLEAN!

ALCONOX
For all equipment washed by hand

Box of 3 lbs.	$1.95
Case of 12 boxes—3 lb. ea.	$18.00
Drum of 25 lbs.	.45 lb.
Drum of 50 lbs.	.42 lb.
Drum of 100 lbs.	.40 lb.
Drum of 300 lbs.	.37 lb.

(Slightly higher West of Rockies)



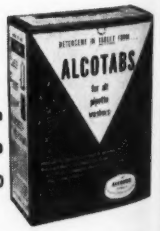
ALCOJET
For all equipment washed by machine

Box 5 lb	$3.00
Case of 6 boxes—5 lb. ea.	$15.00
Drum 25 lb.	.45 lb.
Drum 50 lb.	.42 lb.
Drum 100 lb.	.40 lb.
Drum 300 lb.	.37 lb.

(Slightly higher West of Rockies)

ALCOTABS
For cleaning all pipettes in one easy operation

Box 100 tablets	$5.00
Case of 6 boxes of 100 tablets	$30.00



Order from your favorite supplier or write for literature and sampler.

ALCONOX, Inc.
853 Broadway, New York 3, N. Y.

Check 5155 opposite last page

PERMANITE

Solvent, Alkali, Acid-Proof MORTAR

for tile, brick floors; lining tanks, towers

PERMANITE Mortar is a furan resin manufactured by the Maurice A. Knight Company. It is ideal for use with tile or brick in floors, lining of tanks, towers and chemical processing equipment. It sets up at ordinary temperatures in one to two hours and makes a dense, non-porous joint.

PERMANITE Mortar is resistant to most inorganic acids, organic acids, alkalies of all concentrations, oils, grease, solvents, water and steam at temperatures up to 280°F. It is not suitable for nitric or strong sulphuric acid. Permanite powder and solution have no harmful effect on the skin and are non-inflammable. *Write for our bulletin No. 4-D.*

Knight also has other mortars to meet almost any combination of service conditions — Knight No. 2, silicate base; Knightbond, sulphur-resin base; and Kabo, phenolic resin base.

Maurice A. Knight
Acid and Alkali-Proof Chemical Equipment
4 Kelly Ave.
AKRON 9, OHIO

Check 5156 opposite last page

Plastic coat of armor protects 2-in-1 pipe against corrosion

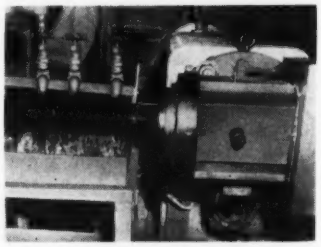
Withstands corrosive soils, water fumes, and electrochemical action

Uses: As buried pipeline in gas, oil, and chemical industries.

Features: Plastic coat of armor protects pipe against external corrosion while core of steel provides strength for pressures and factors of safety.

Description: Polyethylene coated steel pipe is made from selected butt or electric weld. Special elastic adhesive undercoating is applied hot to the pipe. Then controlled thickness of polyethylene plastic is extruded over undercoating. Coating is cut back from the end for welding or for the use of tools on threaded joints.

"Live" elastic undercoating, because of its chemical composition, never sets up or becomes hard and brittle as do most bonding agents. It remains elastic, allowing pipe to be flexed or bent without destroying the bond.



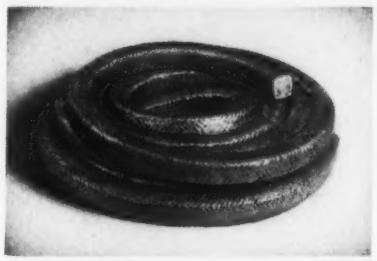
As steel pipe emerges from extruding machine, polyethylene coating is cooled, causing it to shrink around pipe

Tough, outer polyethylene coating matches undercoating in flexibility. It permits coated pipe to be bent or flexed without destroying coating or causing cracks. Field joints can be made with regular pressure sensitive tape and primers.

(X-Tru-Coat pipe was developed by Pipe Div., Republic Steel Corporation, Republic Bldg., Cleveland 1, Ohio.)

Check 5157 opposite last page.

Where Temperatures and Pressures "GET HIGH" ...you need these packings!

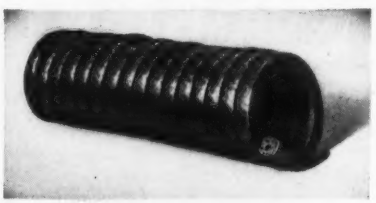


Style HP-2M – excels against severe temperatures and pressures. A braided asbestos packing reinforced with a monel wire insertion. For use on centrifugal and reciprocating pumps, valve stems, expansion joints, etc.

Style No. 30 – a very dense braided asbestos packing, highly resistant to high pressures. For use against petroleum products at high temperatures and pressures.

Style HP-RC – a wrapped asbestos cloth packing with a resilient rubber core. For use on steam hammers, expansion joints, pumps and piston rods calling for high pressure steam, air and gases at temperatures to 600 degrees F.

Style HP-RB–for high pressure steam service up to 600 degrees F. Constructed with a core of accordion-folded asbestos cloth and a resilient rubber back, around which is wrapped a closely woven asbestos cloth jacket.



Aquapak Hydraulic Packing – a semi-metallic packing designed to withstand severe hydraulic pressures. Will give satisfactory service on pressures as high as 10,000 pounds. For use against hot and cold water on centrifugal and reciprocating pumps, outside packed boiler feed pumps and similar equipment.

ALLPAX

"The Packing that Packs All"

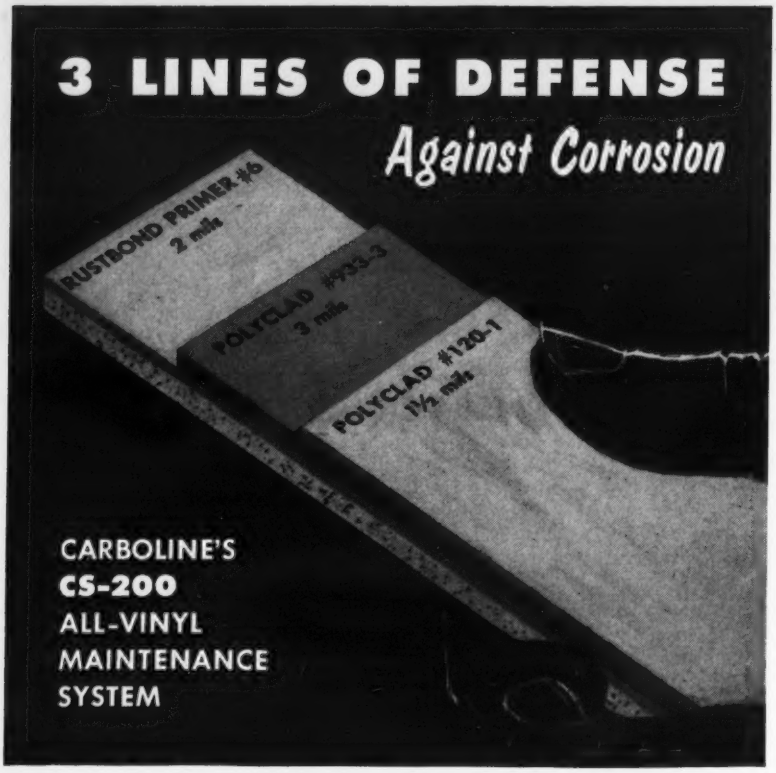
SEND FOR OUR NEW CATALOG — TODAY!

A complete line of packing, tools, gasket materials. Ask for dealer information and price schedules.

THE ALLPAX COMPANY, INC.
160 Jefferson Ave., Mamaroneck, N. Y.
CANADIAN DISTRIBUTORS Albion Asbestos Packings Ltd., Montreal 8, Quebec

Check 5158 opposite last page

3 LINES OF DEFENSE
Against Corrosion



CARBOLINE'S
CS-200
ALL-VINYL
MAINTENANCE
SYSTEM

For general maintenance work, corrosion authorities agree that 3 coats at 5 mils minimum thickness are essential for good protection and economy. Three coats, including a corrosion resistant primer, tend to eliminate porosities often found in heavy-thickness single coat systems.

Carboline's all-vinyl maintenance system has been service-proven to exceed these requirements and assure better chemical resistance to acids, alkalies, water and weathering.

The Carboline CS-200 system (6½-7 mils):

Rustbond Primer #6 good edge coverage, reduces undercutting, bonds tightly to wire brushed steel. Dries fast, speeds application.

Polyclad #933-3 an economical, high build intermediate coat formulated for better resistance to penetration than heavily filled vinyl mastics.

Polyclad #120-1 a tight seal coat with outstanding resistance to chemicals and weathering.

Use Carboline's Engineering Approach—compare solids content, coverage per gallon, mil feet per gallon, mil thickness per coat, resistance to corrosive, estimated recoating cycles, COST PER SQUARE FOOT PER YEAR OF SERVICE. It's the soundest method to determine the most effective, economical corrosion protection.

WRITE TODAY for bulletins and specifications on Carboline's CS-200 All-Vinyl Maintenance System. Also, request our precision wet film thickness gauge—no obligation.

carboline
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St. Louis 17, Mo.

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Boston, New York, Philadelphia, Pittsburgh, Detroit, Chicago, Houston, Denver, Los Angeles, San Francisco, Toronto, other leading cities.

Manufacturers of PHENOLINES and CARBOMASTICS

Check 5159 opposite last page

Concentrations of sulfuric acid from 13 to 19% are especially corrosive. At American Zinc . . .

large diameter PVC pipe carries corrosive electrolyte

Problem: Metal-lined wooden launders handling spent electrolyte at American Zinc Co., of Illinois, had to be repaired and replaced frequently. Launders were open, with a removable top cover. This presented a safety hazard. The linings conducted current, causing a loss of amperage . . . important in plating operation. Current, jumping to metal lining from bottom of electrolytic-cell overflow line, burned holes in the lining which had to be repaired regularly. Spillage of acid over sides of launders caused wood to rot away, necessitating frequent replacement.

Company produces special high-grade electrolyte zinc. Electrolytic cells are used to deposit zinc from acid solution on aluminum sheets from which it is stripped once every 24 hours. Process is repeated on a 24-hr, seven-day-a-week basis. Keeping downtime for repairs to a minimum is imperative.

Since electrolyte going to cells is also acid, corrosion resistance of distribution system is also important. This solution contains 13% sulfuric acid and 15% zinc, and is at 30°C. Spent electrolyte is 19% H_2SO_4 and 10% Zn, and is at a 45°C temperature.

Solution: About one year ago, American Zinc installed a system for distribution to, and draining from, electrolytic cells which makes use of large-diameter, high-impact, unplasticized polyvinyl chloride pipe and fittings. Supply header is 8 inches in diameter and handles 570 gpm at 15 psi.

Electrolyte solution is passed from header to distribution lines by rubber hose. PVC distribution lines carry 38 gpm at 10 psi. Special tap connections distribute electrolyte to each of tanks separately. Expended electrolyte flows by gravity to a 12-inch return line at 570 gpm. Distribution lines are reamed out

Cell room at American Zinc. PVC distribution lines carry corrosive electrolye to each cell

This eight-inch header handles 570 gpm of electrolyte at 30°C, 15 psi. Alternate header is installed as a stand-by

mechanically every other day to prevent scale buildup.

Results: Installation shows no deterioration after more than a year of continuous service. American Zinc estimates that system should last indefinitely even in this corrosive service despite mechanical abrasion of every-other-day reaming. Added bonus: Completely closed system eliminates safety hazard.

(Van-Cor PVC pipe and fittings are a product of The Colonial Plastics Mfg. Co., 2685 E. 79th St., Cleveland 4, Ohio.)

Check 5160 opposite last page.

(Piping system was installed by Shutt Process Equipment Corp., St. Louis 10, Mo.)

Check 5161 opposite last page.

liquid feed destroys steel pipes... *can't hurt B.F.Goodrich Koroseal*

SIXTEEN hours a day, five days a week, a corrosive liquid pours through a pipe in the Riverdale, Illinois plant of Hales & Hunter Company. For years this producer of animal and livestock feed ran this fluid through stainless steel and black pipes.

Corrosion was caused from a mild acid solution which necessitated the changing of piping after approximately 12 months of service. Then in June, 1956 the company installed B. F. Goodrich High Impact Koroseal Pipe. Since then 30 gallons a minute, equal to 154 tons per 16-hour day, have been pouring continuously through this two-inch Koroseal pipe. There have been no maintenance problems and no sign of leakage or wear.

Rigid Koroseal polyvinyl chloride pipe is a relatively new development that is gaining wider usage month in and month out. The pipe is made of Koroseal by a process which permits extrusion and molding of compounds for complete rigidity and high impact quality. B. F. Goodrich Koroseal rigid PVC not only has the highest impact resistance of any thermoplastic pipe, but won't corrode, is easy to install, and cuts maintenance.

To find out how Koroseal can make your operations more efficient, fill in and mail the coupon below. *B.F.Goodrich Industrial Products Company, Marietta, Ohio.*

B.F.Goodrich Industrial Products Co.
Dept. CP-5
Marietta, Ohio

Please send me booklets on:
- ☐ Rigid Koroseal Pipe
- ☐ Rigid Koroseal Sheet

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich ***Koroseal rigid vinyl products***

Check 5162 opposite last page

CATHODIC ACTION FOUND TO BE THE MOST EFFECTIVE RUST PREVENTION*

SEE PROOF

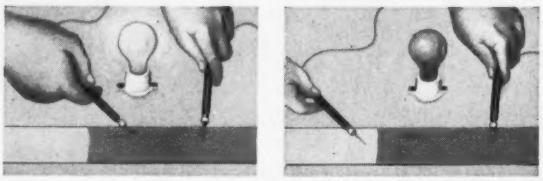
Steelcote

EPO-LUX No. 100

ZINC RICH ZINC DUST PRIMER

provides electro-conductivity for its cathodic protection

* Cathodic protection is utilized by engineers where all other coatings and paints fail to stop rust . . . a reliable guide in your rust control decisions.



At left, above, glass plate is coated with Zinc Rich Z-D Primer. Current carried by zinc film through probes lights lamp; at right, no current flows when one of probes is placed on uncoated glass.

EPO-LUX No. 100 PROTECTS MACHINERY & METAL FROM

ACIDS- - - -

DO YOU WANT . . .

additional information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip opposite the last page of this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story or ad, just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

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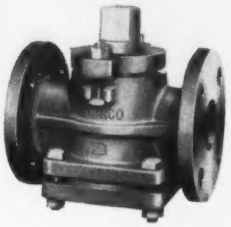
to fill in the slip with the other pertinent information: your name, title, company, product made, address.

For more information on product at right, specify 5168 see information request blank opposite last page.



The **Durco type "F"** valve could be the valve you've been looking for!

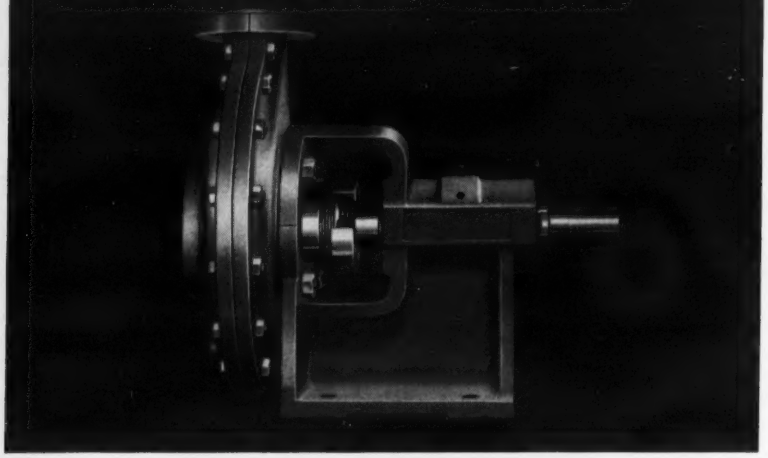
It is extremely simple in design, has a removable Teflon sleeve and is made in several rugged corrosion resisting alloys. There are thousands of happy users of Durco Type "F" valves in the chemical industry.

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

AVAILABLE IN SIZES FROM ¼" THRU 4"

THE DURIRON COMPANY, INC. / DAYTON, OHIO

AMPCO®
ELASTOMER-LINED
CENTRIFUGAL PUMPS



THE ONE ECONOMICAL,
SAFE, DURABLE PUMP THAT
HANDLES HCl

Eight sizes *in stock* — linings of natural rubber, Neoprene, and Hypalon. See your nearby Ampco Pump Distributor.

Saves you the extra expense of a special pump made from costly or dangerously fragile alloys — to handle muriatic acid — HCl, bleaching agents, mixed acids, cleaning solutions, plating solutions, abrasive slurries, and other destructive media.

Will not affect taste or color, nor introduce impurities into the material being pumped. Resists damage by stray currents in plating baths and from galvanic effects.

Capacities — heads range to 400 GPM and 100' TDH.

Write for free Bulletin P-6.

AMPCO METAL, INC.

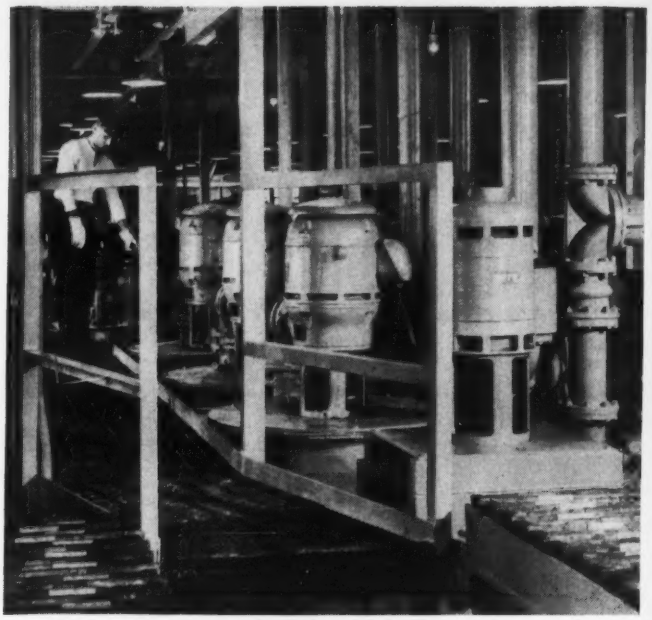
Dept. CP-5, Milwaukee 46, Wisconsin • West Coast Plant: Burbank, California

P-34

AMPCO®
SPECIAL ALLOY AND NON-METALLIC CENTRIFUGAL
PUMPS

Always depend on AMPCO when pumping corrosive media

Check 5169 opposite last page



Pumps transfer corrosive fluoborate solution from storage to plating cells at 800 gpm

In plating telephone drop lines at Western Electric, the wire receives 32 separate treatments in nine different chemical solutions. Six are highly corrosive. Engineers have found that . . .

stainless steel pump parts resist aggressive corrosives

Cast stainless steel pumps have been a major factor in successful handling of corrosive copper fluoborate electrolyte at the Point Breeze Works of the Western Electric Co. Solution of copper fluoborate contains approximately five ounces per gal of fluoboric acid and 20 ounces per gal of copper. This solution has a pH of less than one, specific gravity of 1.4, and is used in temperature range of 120 to 135°F.

To handle this and other highly corrosive materials used in multiple-plating process for telephone drop wire, engineers have standardized on heavy-duty vertical sump pumps. All of the metallic pump components below the base plate are made of cast stainless alloys, except for studs and nuts which are made of a corresponding grade of wrought stainless. Most of the parts such as impeller and impeller housing are statically cast. Supporting and discharge pipes are centrifugally cast.

To circulate fluoborate solution from storage tanks to plating cells, pumps made of type CN-7M alloy are submerged in the tanks, and de-

Alloy Compositions

	CN-7M*	CF-8M*
nickel %	29	11
chromium %	20	20
molybdenum %	2	2.5
copper %	3	—
carbon % max	0.07	0.08

**Alloy Casting Institute designations*

liver 800 gpm at a 60-ft head. Same type pumps, made of type CF-8M alloy, circulate fluoborate solution during continuous filtering and intermittent handling, but are mounted external to tanks. These deliver 50 gpm at 125-ft head.

Other solutions in multi-plating process are also of a very corrosive nature and are being handled by similar pumps with components fabricated from stainless. These include:

1) Mixed alkali cleaner with a specific gravity of 1.1, temperature 190°F, delivered at 350 gpm under a 50-ft head.

2) A 15% sulfuric acid pickling solution at 90°F, 200 gpm under a 40-ft head.

3) Hydrofluosilicic acid bath to remove oxide formed during annealing treatment is handled at 40 gpm under a 40-ft head at 90°F.

4) Electrolyte of lead fluosilicate used for lead plating is moved at 150 gpm, 150°F, a 40-ft head.

For those applications where conditions do not warrant stainless steel pump components, standard heavy-duty sump pumps are used.

(Sump pumps were supplied by Aurora Pump Div. of New York Air Brake Co., Aurora, Illinois.)

Check 5170 opposite last page.

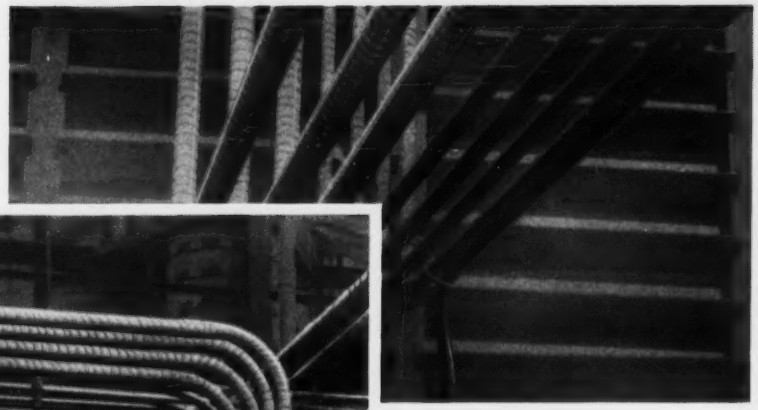
(For further information on stainless steel alloys contact Alloy Casting Institute, 286 Old Country Rd., Mineola, New York.)

THE MODERN TOOL... AT WORK FOR MODERN INDUSTRY

to stop corrosion

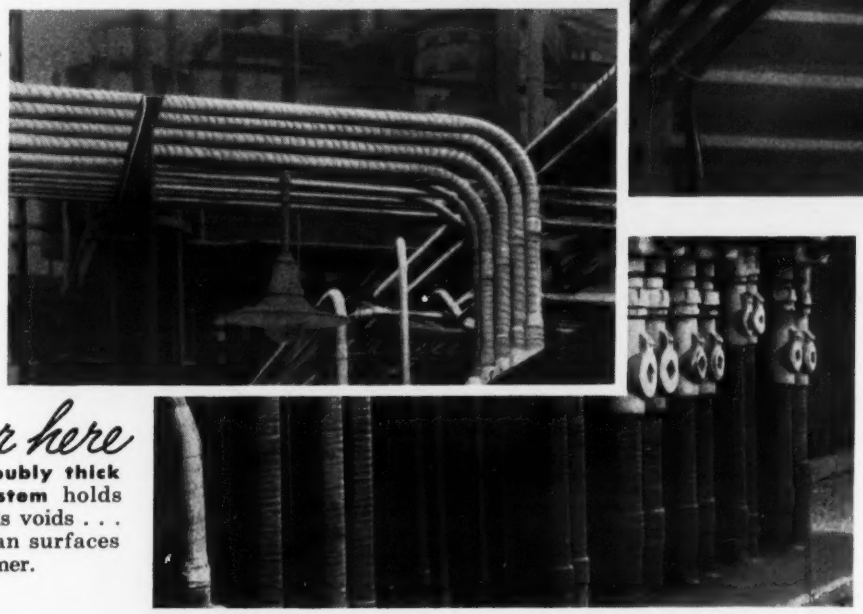
here

Polyken Protective Tape Coating is tough and long-lasting . . . that's why maintenance men prefer it to costly repainting.



or here

Polyken is polyethylene tape coating . . . elastic, inert, nondrying . . . offering stable protection under severe chemical conditions.



or here

Polyken's doubly thick adhesive system holds tight . . . seals voids . . . bonds to clean surfaces without a primer.

start here

(contact your local Polyken distributor)

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Philadelphia, Pa.: Harold N. Davis Co.
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Plainfield, New Jersey: Stuart Steel Protection Corp.
St. Louis, Mo.: Shutt Process Equipment Corp.
San Francisco, Calif.: Aetna Sales Co.
Seattle, Wash.: Farwest Corrosion Control Corp.
Seattle, Wash.: Pacific Water Works Supply Co.
Tulsa, Okla.: William Cluff Corp.

Polyken®

Experienced in modern PROTECTIVE COATING

THE KENDALL COMPANY
Polyken Sales Division

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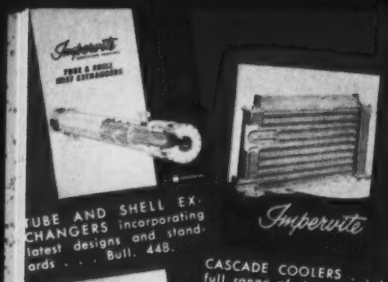

TUBE AND SHELL EXCHANGERS incorporating latest designs and standards . . . Bull. 448.

CASCADE COOLERS . . . full range of sizes covered for volume cooling applications . . . Bull. 537.

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RUPTURE DISKS made of impervious graphite display some truly amazing properties which save money for processors . . . Bull. 315.

COSTS AND STANDARDS of impervious graphite processing equipment . . . Bull. 249.

FIELD SERVICE provides trained men for installation, re-location or repair of any impervious graphite equipment . . . Bull. 24.

CENTRIFUGAL PUMPS . . . Bull. 854.

FALLS INDUSTRIES, INC.
31909 Aurora Rd., Solon, Ohio

SEND THE FOLLOWING LITERATURE:

- ☐ Bulletin No. 448
- ☐ Bulletin No. 965-1
- ☐ Bulletin No. 537-A
- ☐ Bulletin No. 854
- ☐ Bulletin No. 753-2
- ☐ Bulletin No. 315
- ☐ Bulletin No. 249
- ☐ Bulletin No. 24
- ☐ Bulletin No. 537
- ☐ Bulletin No. 505

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

CITY ZONE STATE .....

. . . another exclusive development from FALLS (FI) INDUSTRIES

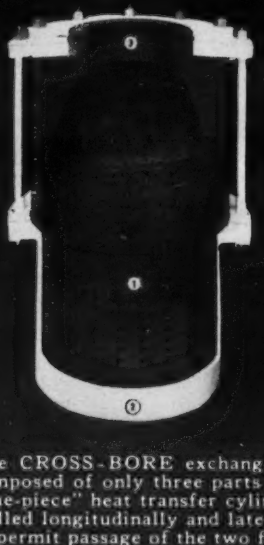
. . . the almost perfect heat exchanger

Impervite

IMPERVIOUS GRAPHITE

CROSS-BORE

HEAT EXCHANGER



The CROSS-BORE exchanger is composed of only three parts: (1) "one-piece" heat transfer cylinder, drilled longitudinally and laterally to permit passage of the two fluids or gases, (2) shell, and (3) domes. CROSS-BORE exchangers have been proving their unique value in field service for over 4 years.

. . . unaffected by all corrosives except a few highly oxidizing agents . . . strongest, shock resistant construction available in any impervious graphite exchanger . . . 20% higher overall heat transfer coefficient than tube and shell design . . . provides new ease for thorough cleaning of shell side as well as tube side holes . . . immune to thermal shock . . . results in longer service life . . . accommodates pressures in the 150-200 psi range at temperatures to 340° F . . . overall dimensions same as tube and shell design . . . available in capacities to 470 sq. ft. heat transfer surface.

Write today for quotation on your heat transfer requirements . . . start enjoying the profits and efficiency of maintenance-free, corrosion-proof heat transfer equipment.

FALLS (FI) INDUSTRIES, INC.

AURORA ROAD • SOLON, OHIO

Phone: CHurchill 8-4343 • Teletype No. Solon 0-720

SEE OUR CATALOGING IN C E C

Tough protective coating is corrosion-resistant has natural 'stretch'

Resists impact, moisture won't chip or peel

Uses: As protective coating for equipment, structures, tanks, floors, trucks, boats, ships, and machinery.

Features: Material has outstanding properties of corrosion resistance, impact resistance, long life, and weather and moisture resistance. It has a natural "stretch", and it will not chip or peel when bent or dented.

Description: Protective coating is a balanced chemo-setting synthetic resin coating containing silicones and epoxies. It contains no plasticizers or oils that normally cause saponification or progressive age embrittlement and deterioration. It cures both by solvent evaporation and internal polymerization. Surface finish with greatly increased molecular weight and extremely positive bond and surface hardness characteristics results.

(Mono-Seal protective coating is product of Mono-Seal Products, 44 Garden St., Everett 49, Mass.)

Check 5172 opposite last page.

Pipeline corrosion

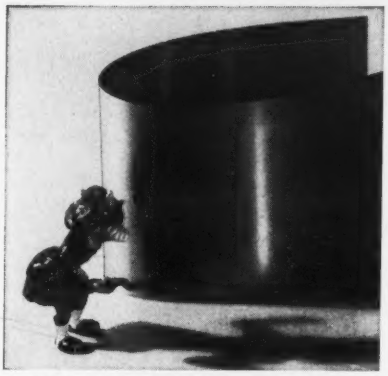
Manufacturer of PVC tapes offers brochure containing report on product's corrosion resistance, adhesive performance, properties, and method of protection. Separate data folder contains information on PVC and butyl rubber tape films, including approximate pipe coverage requirements and application instructions. PVC Tape Brochure — Plicoflex, Inc., 5501 Santa Fe Ave., Los Angeles 58, Calif.

Check 5173 opposite last page.

For more information on product at left, specify 5174 . . . see information request blank opposite last page.

No matter which FINISH you like—you can buy it in

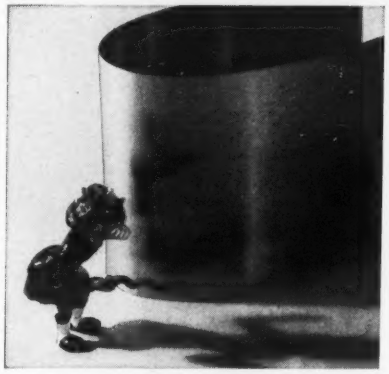
MicroRold® QUALITY STAINLESS STEEL



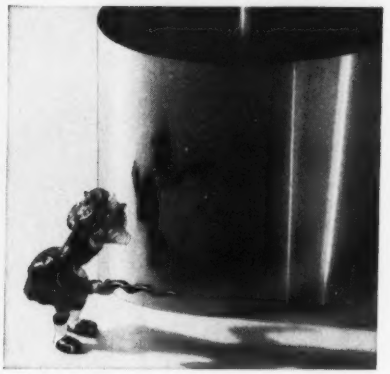
2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.

No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.



No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.



No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.

BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

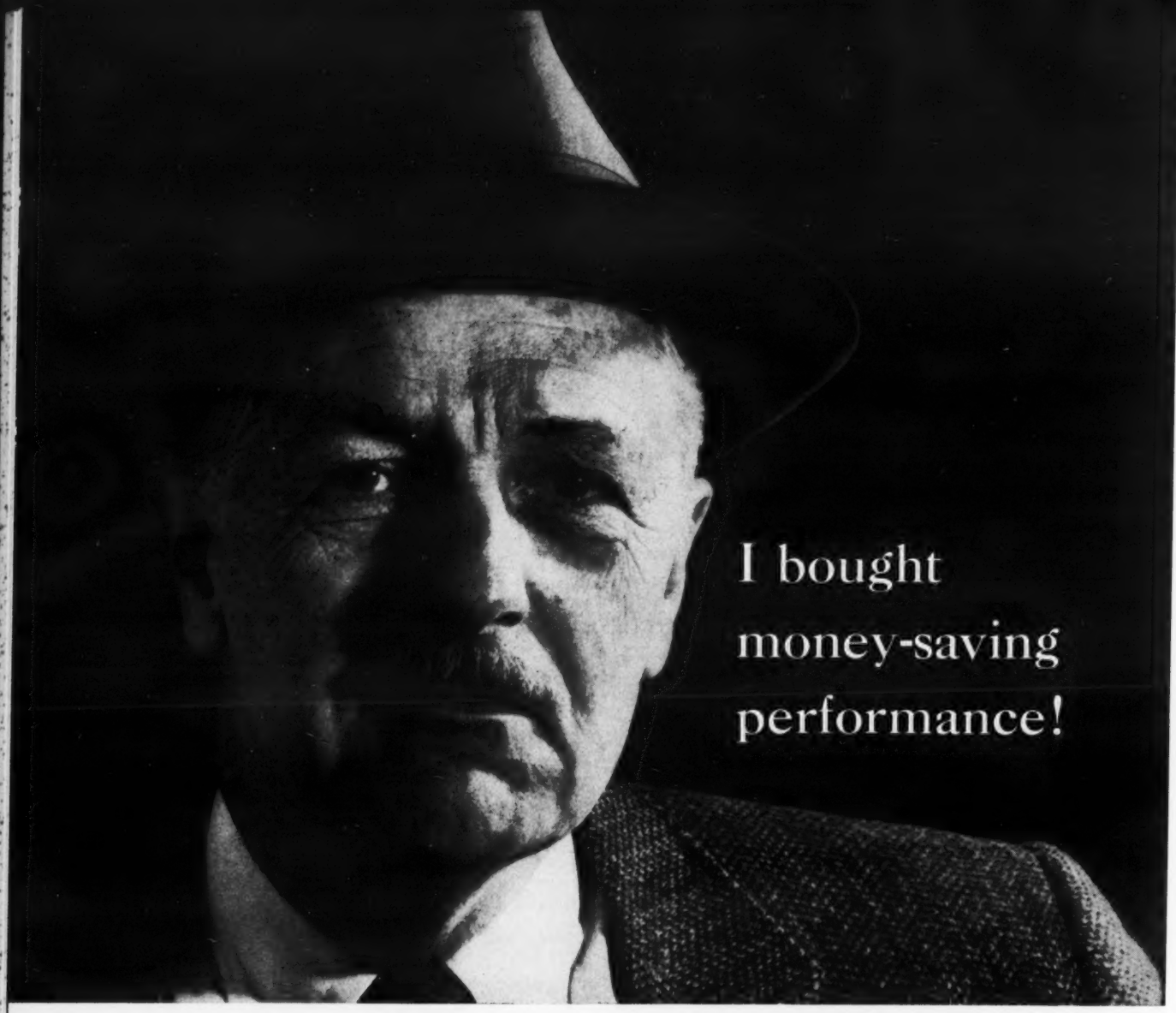
WASHINGTON STEEL CORPORATION MicroRold STAINLESS SHEET & STRIP

Washington Steel Corporation

Producers of Stainless Sheet and Strip Exclusively

5-U WOODLAND AVENUE, WASHINGTON, PA.

Check 5175 opposite last page



try titanium now!

High initial cost? Sure! But titanium means less equipment to replace, less downtime for repairs . . . can actually *save* you money on processing equipment and parts!

For example, a titanium steam jet diffuser lasted 3 years instead of 3 months. A titanium valve handling corrosive and erosive fluid lasted 1,680 hours instead of 70. A titanium nozzle used with chlorine dioxide lasted 13 months instead of 5 hours.

Only titanium combines high corrosion resistance with light weight and strength in standard and specially designed processing equipment. It will *pay* you to try titanium now. There's a plentiful supply.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Booklet tells where you can get titanium mill products and fabricated equipment. Also gives cost-saving service records in process industries.

ELECTRO METALLURGICAL COMPANY CP-5
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

Please send me a copy of "New Heat on Titanium Problems."

Name _____

Company Name _____

Company Address _____

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 10.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois

For more information on product at left, specify 5176 see information request blank opposite last page.

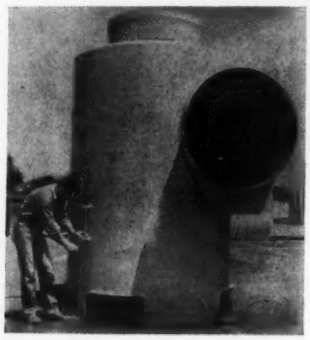
Plastic fume washer is lightweight non-corrosive

Requires little maintenance; can be installed easily

Uses: For removing acid-laden or harmful vapors and plating fumes from air exhausts.

Features: Unit is corrosion resistant, lightweight, and practically maintenance free. Because of its plastic composition, it weighs only one-third as much as conventional units. It may be installed on roof; no extra foundation or special footings are required.

Description: Fume washer is constructed of glass fiber-reinforced polyester. Motor and blower are housed separately. In operation, exhaust blower creates a powerful suction which draws fumes into washer receiver shell. The fumes circulate through rotary action at controlled velocities while their solids and contaminators are washed into the water reservoir by a spray system.

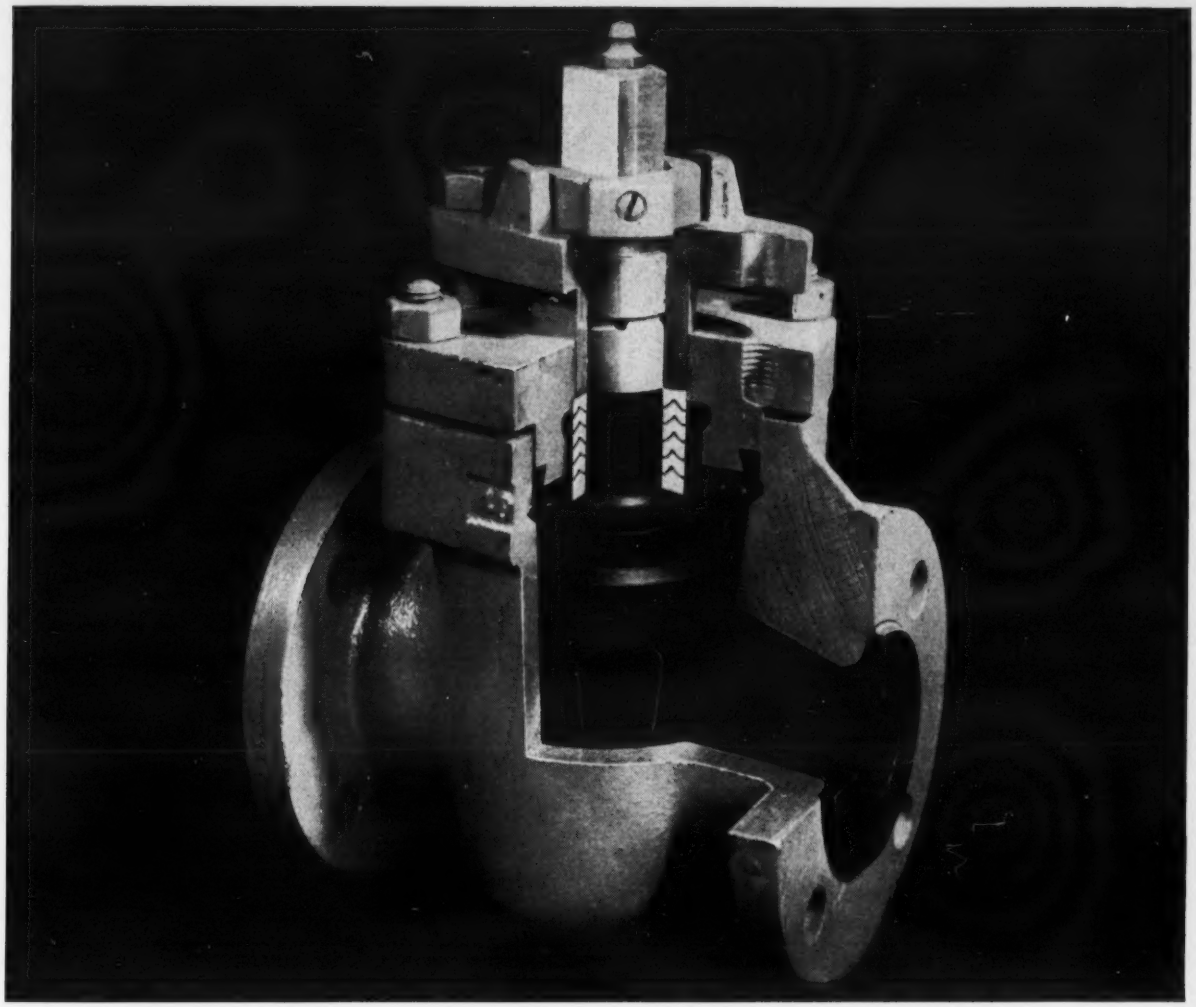


Lightweight, plastic air scrubber can be easily installed on roof — requires little maintenance

It is unnecessary to disassemble washer for service. Water reservoir requires only infrequent cleaning and is easily entered through a lower access door. Cleaning of the spray nozzles is achieved through upper access doors.

(L-O-C fume washer is manufactured by Line-O-Coat Co., 1230 South Santa Fe Ave., Compton, Calif.)

Check 5177 opposite last page.



You can see why Saran Lined Pipe costs so little per year of service

Saran anchored within a steel casing safely conveys corrosive liquids for years of trouble-free service

There's something special about this valve. It's saran lined and has a Teflon V-ring packing for easier opening and closing and more perfect sealing with less pressure. And yet, the fact that valves like this are stock items is another example of why saran lined piping systems are more economical to install.

Immediate availability of Saran Lined Pipe, valves, pumps and fittings means there's no waiting. And Saran Lined Pipe can be cut and threaded right on the job with conventional tools. This lower fabrication cost, combined with the long life of corrosion-resistant saran, means that complete saran lined piping systems cost less in the long run.

Saran Lined Pipe with the new gray liner gives trouble-free service under operating pressures from full vacuum up to 300 psi and temperatures from -20° F. up to 200° F.

Send the coupon today to learn how you can save by installing a complete corrosion-free piping system with Saran Lined Pipe, valves, pumps and fittings. And be sure to ask about Saraloy® 898 tank linings. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. 2003 B
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

Please send me information on: ☐ Saran Lined Pipe, fittings and valves ☐ Saran lined centrifugal pumps ☐ Saraloy 898 chemical-resistant sheeting

Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

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MOBILE GAS STORAGE WHERE YOU WANT IT FAST WITH

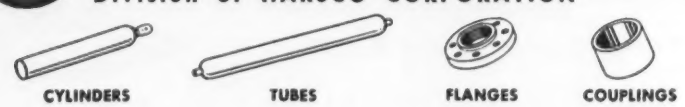
TW GAS TRANSPORTS

Oil refining, petrochemical, food processing and electronic companies have found these TAYLOR-WHARTON transports convenient, flexible and economical for interplant haulage and standby equipment. Bulk storage — 25,000 to 100,000 cu. ft. — of oxygen, nitrogen, hydrogen, argon, helium, compressed air and ethylene can be handled with ease.

Each transport consists of a number of 2400 p.s.i. seamless steel storage pressure tubes, valved and manifolded together to a single common outlet in a rear mounted weatherproof cabinet. The tubes themselves, completely heat-treated and meeting I.C.C.-3A2400 specifications, are rigidly mounted on standard semi-trailer chassis.

More than a Century in Harrisburg 24, Pa.

H HARRISBURG STEEL CO.
Division of HARSCO CORPORATION



Check 5179 opposite last page

Growing popularity of palletized handling, plus an improved product, led American Cyanamid to seek a better packaging system for their benzothiazyl disulfide rubber accelerator. Results: a more stable unit load and . . .

A 20% CUT IN STORAGE
secret: VACUUM

THEODORE W. WETT, Assistant Editor
With **W. J. MATHEWS,** Departmental Engineer
Rubber Chemicals Manufacturing Department
American Cyanamid Co., Bound Brook, N. J.

One man handles filling operation formerly requiring two or three. Note absence of dust

Problem: Former method of packing MBTS (benzothiazyl disulfide) at American Cyanamid Co., Bound Brook, N. J., resulted in considerable dust. Capacity was twenty 50-lb bags per hour with a crew of two or three men.

MBTS had long been packaged in 50-lb gusset bags of four-ply kraft. Experiments with unit loading techniques indicated that a redesign of package was necessary to form unit loads that would be easier to handle and make more efficient use of trucks and warehouse space. Temporarily, a stovepipe-shaped bag measuring 40x13" was adopted. Unit load consisted of 10 four-bag layers. However, air extruded as stack settled left bags somewhat flabby. Bags and stack were still awkward to handle.

Serious consideration of a more efficient, dust-free packaging setup was expedited by two separate developments: Process improvements resulting in a product with exceptional characteristics of dispersibility and high purity; development of wider gusset bags of optimum size and shape for unit loading.

Solution: Almost simultaneously, American Cyanamid's packaging committee discovered a vacuum filling machine. Samples of the improved product were thoroughly tested under packaging conditions. Since vacuum packer densified product by about 25%, care had to be taken to be sure that it still acted as a finely dispersed powder in application. Testing was completed in December 1955. Extensive work with bag manufacturers resulted in 16 x 30" bags with 7½" side gussets and tuck-in sleeve valves of 6½" diameter to fit

REQUIREMENTS FILLER

nozzle of packing machine.

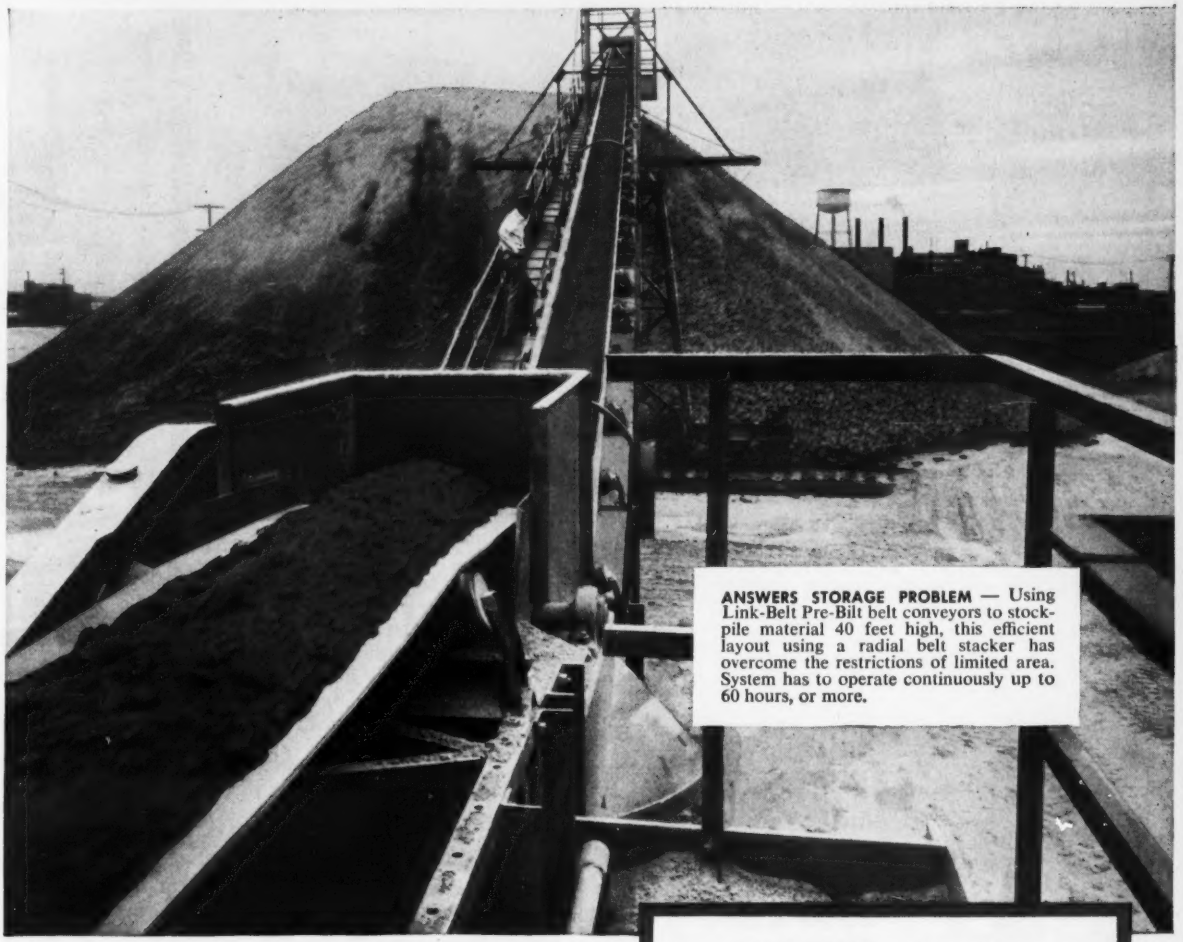
Packer operates as follows: Bag is placed on filling spout. Vertically split shroud, which is built up on inside to support filled bag and limit expansion, closes over bag and spout. Vacuum forms bag to shroud and pulls material from hopper into bag until desired weight is obtained. Filling stops automatically and shroud opens. Bag is then removed and check weighed. Only hand operation required is opening and inserting bag on spout and removing filled bag. Once start button is pushed, cycle is automatic.

Results: Capacity has been tripled, from 20 to 60 bags per hour. One man handles operation formerly requiring two or three. Since vacuum packer gives freshly packed MBTS density usually attained only after prolonged storage, 20% less storage space is needed. Palletized unit loads of 2000 pounds are only eight instead

Stable unit load obtained with densified bags of MBTS handles easily. Palletized handling means big savings to customers

Durable answer to you who have asked for a

husky sectional belt conveyor



ANSWERS STORAGE PROBLEM — Using Link-Belt Pre-Bilt belt conveyors to stockpile material 40 feet high, this efficient layout using a radial belt stacker has overcome the restrictions of limited area. System has to operate continuously up to 60 hours, or more.

LINK-BELT Pre-Bilt Belt conveyors handle up to 1500 tons per hour

Per pound of weight, no other sectional belt conveyor tops the strength and rigidity of Link-Belt Pre-Bilt Sectional Belt Conveyors.

For full information on these durable conveyors up to 36 in. wide—with drives up to 40 hp, 24 and 42-inch truss depths or simple channel stringer type — contact your nearby Link-Belt office.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

From selection to erection . . . you save every step of the way with quality pre-engineered equipment

NO DETAILED DRAWINGS—From standardized data, a Link-Belt engineer will prepare an "on-the-site" quotation covering the components for your needs.

LOWER PURCHASING COSTS—Interchangeability and standardization reduce costs and speed selection of parts . . . all available from Link-Belt.

NO COSTLY DELIVERY DELAYS—PRE-BILT conveyors are built at eight strategic locations and are shipped from the plant nearest you to assure prompt delivery.

QUICK LOW-COST INSTALLATION—Simple construction and shop-assembled components facilitate field assembly and installation by your own or Link-Belt erectors.

MINIMUM OPERATING COST—These conveyors require a minimum of power for the tonnages of materials handled. Maintenance normally consists only of lubrication.

Check 5180 opposite last page

● This new, air-operated pump and forced induction plate completely seals in the material, prevents contamination, spillage, channeling and waste. Eliminate slow hand operation and messy transfer of difficult material!

You paid for all of it . . . now get all of it! Graco Inductors move from top to bottom, scrape drum sides entirely clean, get *all* material from drum. Sizes for 55 gal. drum, half drum or 5 gal. pail. Write today for details!

GRACO "DIRECT-FROM-DRUM" PUMPS

GRAY COMPANY, INC.
52 Graco Square • Minneapolis 13, Minnesota
FACTORY BRANCHES: New York (Long Island City) • Philadelphia • Detroit
Chicago • Atlanta • Houston • San Francisco
SALES OFFICES: Washington • Toronto

Check 5181 opposite last page

Check 5182 opposite last page

HANDLING & PACKAGING

of 10 layers high. In storage, 12 loads occupy cubic space which previously accommodated only 10. With greater stability and lower height, new unit loads can be stacked two or even three high. Dust has been minimized.

(Vacuum filler was supplied by The Carter Engineering Co., 123 N. Hazel St., Danville, Illinois.)

Check 5183 opposite last page.

(Bags were manufactured by Fulton Bag and Products Co., 1400 Annunciation St., New Orleans 13, La.)

Check 5184 opposite last page.

Cargo damage reduced, handling speeded up, with dunnage cushion

Uses: Protecting rail shipments.

Features: Material has practically eliminated cargo damage in rail shipments, speeded up loading and unloading of box cars, and displaced wasteful bracing and shoring lumber in many types of shipment.

Description: Pneumatic dunnage cushion is made of weatherproof nylon with neoprene coating on each side. Cushion is equipped with butyl-compound bladder, similar to a tire innertube, and large-volume diaphragm valve. When deflated, cushion falls into compact 6 x 15 x 24" cubes for easy storage or return if not used for transshipping.

Inflated cushion measures 4 x 4 x 5' and can be expanded from one to ten lb per sq in. Cushion has a bearing surface of 40 x 40" or 40 x 50" and weighs between 28 and 33 lb. Pressure within cushion can be maintained for long periods, and it can undergo altitude and temperature changes anywhere in the US without ill effect.

(Pneumatic dunnage cushion is product of the United States Rubber Co., 1230 Ave. of the Americas, New York 20, N.Y.)

Check 5185 opposite last page.

OFF THE SHELF DELIVERY
from the greatest lineup of plastic jars and vials available anywhere
Polystyrene, acetate, butyrate and polyethylene jars and vials for:
Electronic components . . . Small machine parts . . . Tools . . . Powders and hundreds of other purposes
They'll protect your product from moisture, contamination, dirt. Shatterproof Clearsite vials are easy to label or print in 1 to 5 colors. Tell us what you want to package and we'll send you free samples and literature. Address Dept. G.
CELLUPLASTIC CORPORATION
Sales Office: Newark 5, New Jersey

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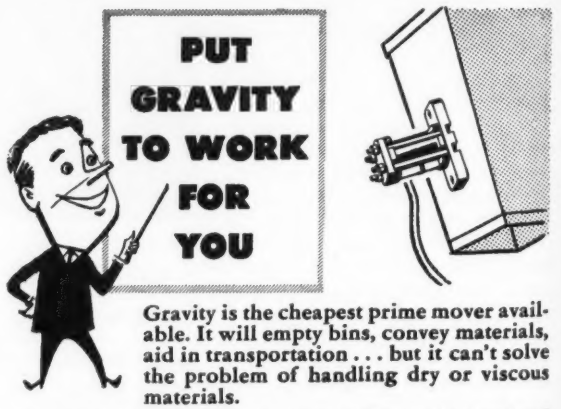

Gravity is the cheapest prime mover available. It will empty bins, convey materials, aid in transportation . . . but it can't solve the problem of handling dry or viscous materials.

It takes the engineered application of Cleveland Vibrators to break up the frictional forces which cause adhesion and jamming. Vibration keeps materials moving in a full and controlled flow.

Cleveland Vibrators can be installed on all types of equipment for handling and processing chemicals. We will be happy to give you detailed data for your specific application, or a catalog for your reference files.

Air or Electric
Portable or Permanent
Silent or Standard
Bin Stuck Lately?
THE CLEVELAND VIBRATOR CO.
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If you have, you will want to make sure that your copy of CHEMICAL PROCESSING will continue to come to you on time.

Maybe . . .

you have received a promotion and have been transferred to a new location.

Or, if you have changed your affiliation, we want to make sure that your copies of CHEMICAL PROCESSING will follow you.

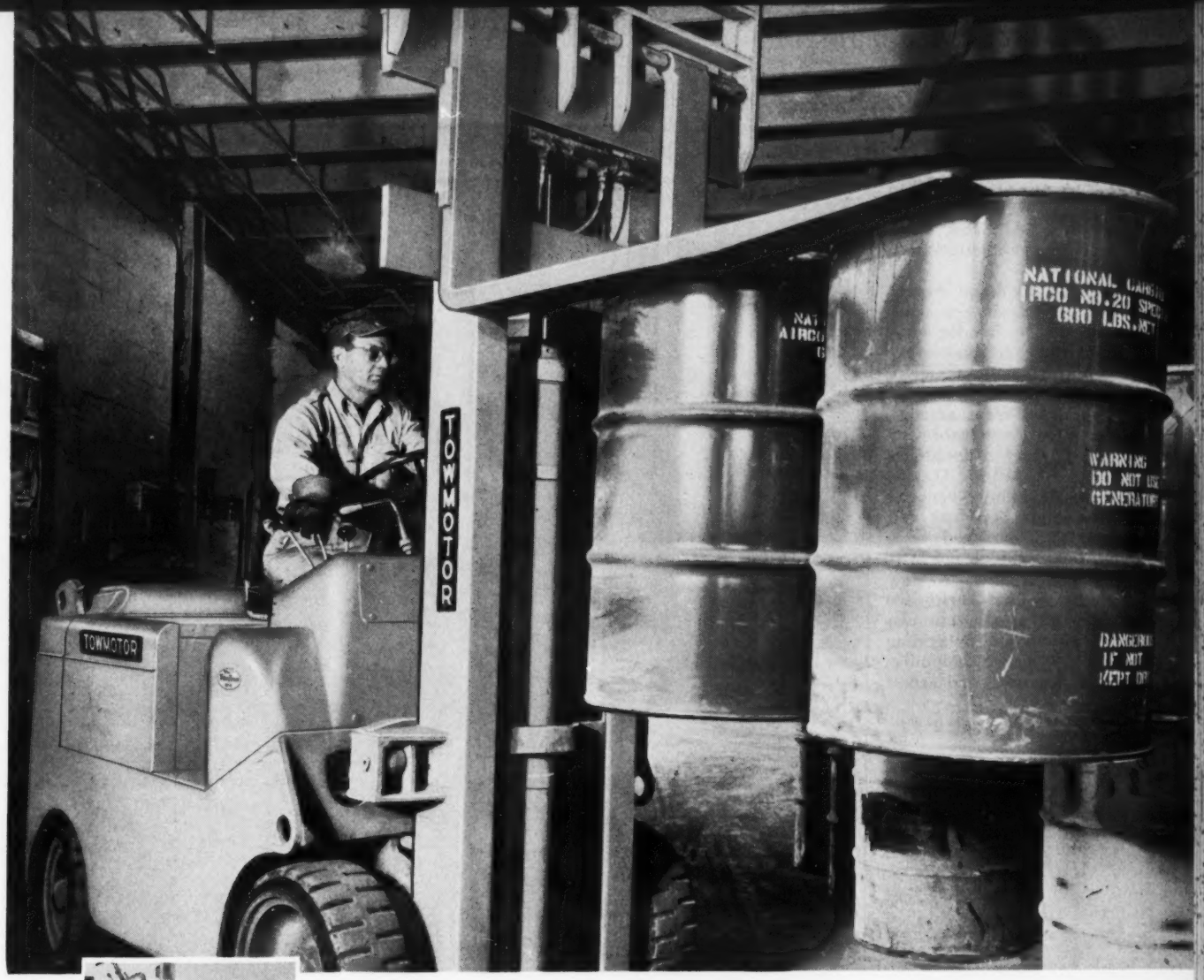
Fill out . . .

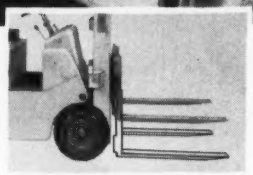
the slip opposite the back cover. Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city, state.

Mail this slip to the Reader-Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

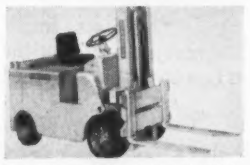
For more information on product at right, specify 5188 see information request blank opposite last page.





Towmotor's Maximum Free Lift Range tops all for reachability—lets you safely utilize the "top ½" of valuable storage space usually wasted.

TowmoTorque Drive offers you cushioned "creep" control unequalled in the industry today. Driving ease is more than tripled when you add Towmotor Power Steering.



New "Pace-Maker" Model 600 is typical of the easy-handling fork lift trucks in the combined Towmotor-Gerlinger line. Load capacities from 1500 to 40,000 pounds.

Today's industries need Towmotor Continuous Operation

New Towmotor "Pace-Maker" Fork Lift Truck is easiest to enter, maneuver and control:

Towmotor engineering has skillfully combined dual-entry convenience, extra leg-room, handy 12-inch reach controls and easy maneuvering ability in the new "Pace-Maker" series fork lift trucks. You get a lot of advance features not duplicated in any other industrial truck!

Towmotor balanced weight distribution assures full traction with or without load. Positive-action hydraulic lift system guarantees instant response. Maximum free lift range is tops in industry. New standards of easy handling are established by "Pace-Maker" features like these!

Send for Booklet SP-23 showing how industry's most complete line of fork lift trucks will improve your plant operations and lower your production costs.

Leaders for 39 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR THE ONE-MAN-GANG **-GERLINGER**

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation, Cleveland 10, Ohio

☐ Send free Towmotor Booklet SP-23

☐ Send free Certified Job Studies relating to our business which is:

Name_____

Company_____

Address_____

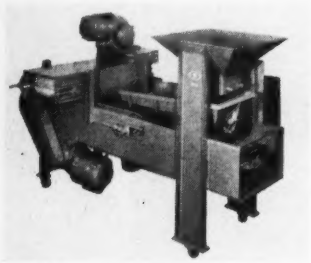
Mail to **TOWMOTOR CORPORATION,** Cleveland 10, Ohio

Mobile magnetic separator saves time, labor—product purity high

Speed rate controlled, magnetic intensity adjusted

Uses: For tumbling barrel applications, which are usually difficult to handle efficiently because of high percentage of magnetic material encountered. Unit is also said to be highly efficient as concentrator and separator for many products, including scrap of all kinds.

Features: Highly concentrated magnetic product can be obtained from feed containing low or high percentage of iron. Quality of separation and product purity are high because speed rate can be controlled and magnetic intensity adjusted. Mobility of unit saves time and labor.



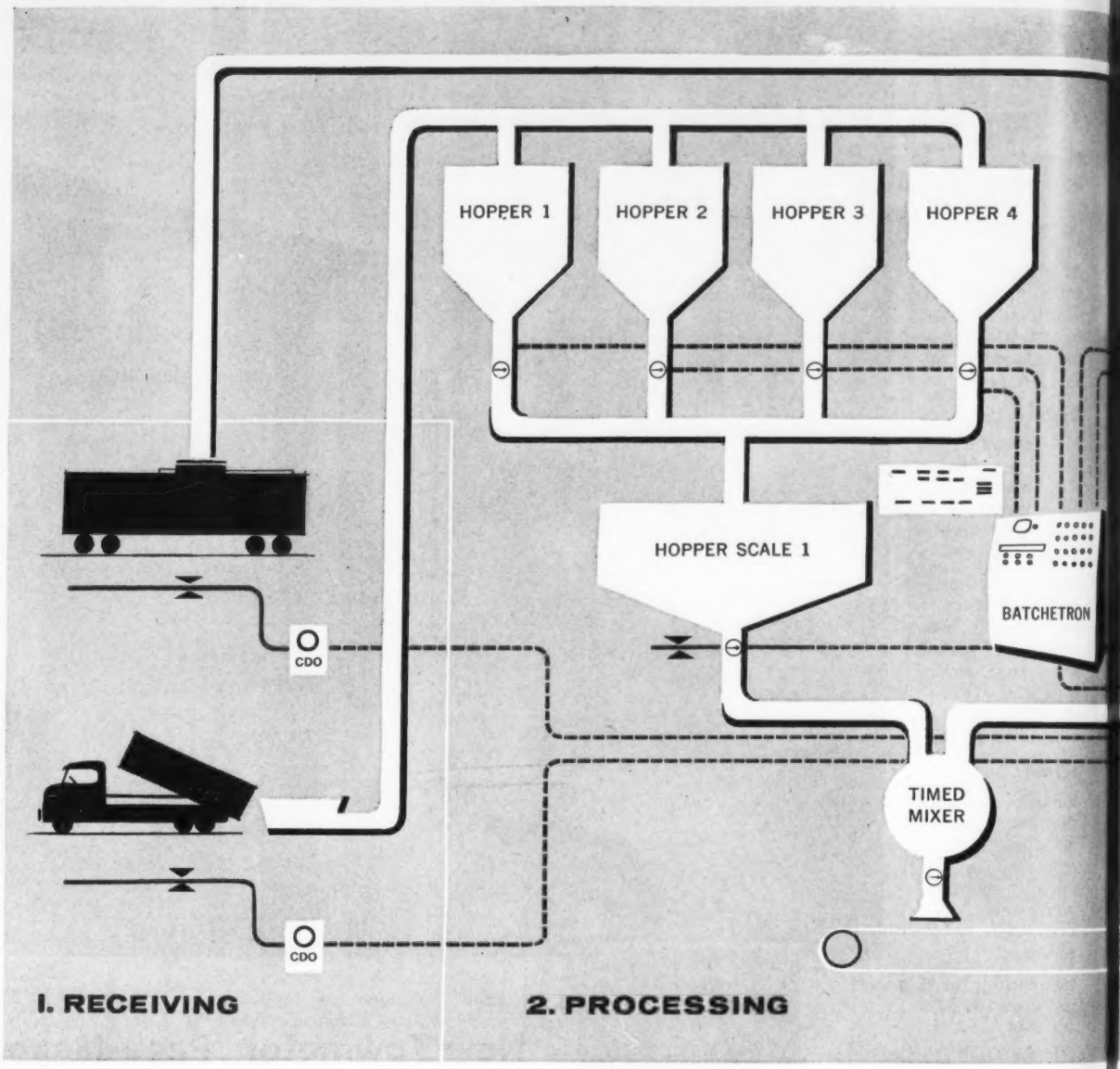
Mobile magnetic separator provides high quality of separation and product purity

Description: Self-contained, mobile, magnetic separator consists of hopper with adjustable-gate vibrating feeder and self-cleaning permanent alnico plate magnet, all mounted on a mobile conveyor. In operation, a controlled, even layer of material is fed to conveyor, and as it passes under magnet, iron is lifted out of burden. Magnetic attraction holds iron on underside of moving cross-belt until it is discharged off to one side.

Operation of unit is fully automatic. Magnet is non-electric.

(TBS magnetic separator is product of Dings Magnetic Separator Co., 4740 West Electric Ave., Milwaukee 46, Wisconsin.)

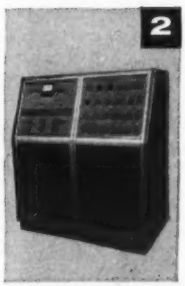
Check 5189 opposite last page.



METER···MANAGE···MONITOR

Electronic Load Cell

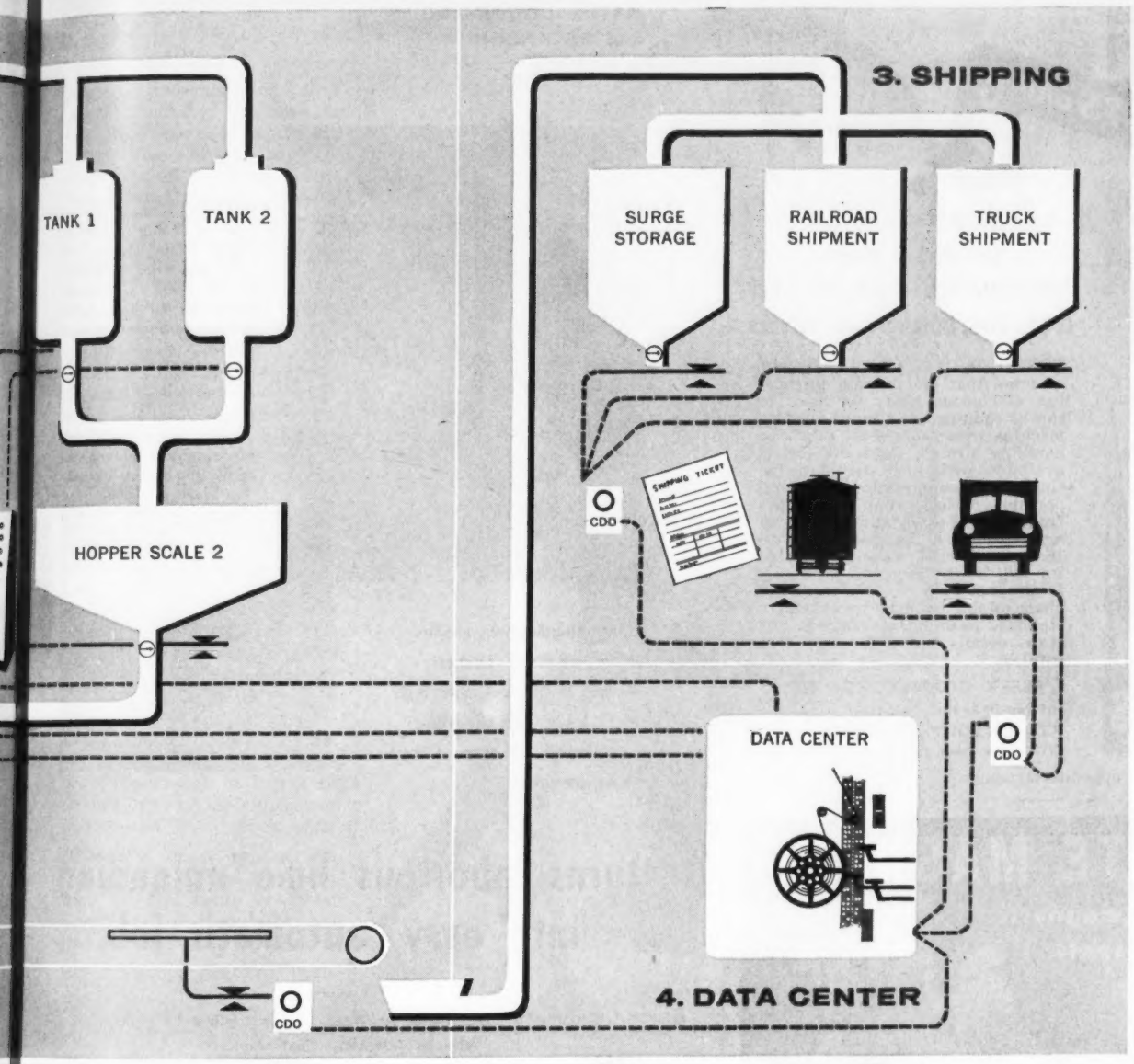
1. Starting with receiving of all raw materials, liquid and bulk, Fairbanks-Morse electronic process control can put your entire operation on a closely supervised basis—automatically. Weight data can be continually fed to current inventory records. Low supply level of any or all raw materials can automatically signal reorder requirements.



F-M Control Console

2. Flexible F-M control systems can be "fitted" to your requirements. You have widest selection of programming techniques—punched-card, tape, push-button, etc. Fully interlocked, the system is completely safeguarded against mechanical or human errors such as "double" or "off-spec" batching. Cycle of operations is easily adjusted or revised.

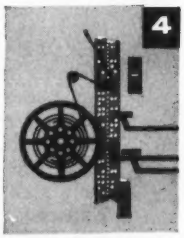
SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



with F-M ELECTRONIC PROCESS CONTROL

Visual and Printed Read-Out

3. Throughout receiving, processing and shipping cycles you can establish visual and/or printed digital read-out stations, maintaining all the advantages of full information in every department. Each shipment can generate its own shipping weight ticket as it arrives on the shipping dock.



4. Every item of variable cost... profit ...can be instantly determined as data are fed automatically from all points in the F-M control system to centrally located automatic typewriters, adding machines, billing machines and computers. F-M has the equipment, experience and the proven ability to automate your operations on a turn key basis.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

FOR FREE AUTOMATION FEASIBILITY STUDY, WRITE: FAIRBANKS, MORSE & CO., CHICAGO, ILLINOIS

Check 5190 opposite last page

Continuous weighing device works on new principle

Weighs material in motion with accuracy

Uses: Weighing small lump, granular, or flaky dry bulk material.

Features: Device indicates material flow at any moment, in pounds per minute, pounds per hour, or tons per hour. Device can provide chart record of flow rate for 24-hour periods, and will record total weight from starting time to any given moment. Accuracy is high.

Description: Continuous weighing device is simply a circular trough balanced on a pivoting fulcrum. A revolving turret, equipped with flights or blades, moves material through the circular trough from intake to adjacent outlet point. Pressure is exerted on mechanical linkage in proportion to volume being fed. Continuous weight recording is made on an indicator head through the linkage.

Entrance and emergence points of the material being weighed, are in direct line with pivot axis of weigher, thus eliminating any weight error due to dropping of material and depth of stream. The turret pan, or container, can be completely enclosed, dust tight, and gas tight.

Weigher may be used in connection with any type of conveying or feeding equipment. Minimum headroom is required.

(S-A Continuous Weigher is manufactured by Stephens-Adamson Mfg. Co., Aurora, Illinois.)

Check 5191 opposite last page.

About film packaging

Bulletin of four pages describes equipment for film-packaging irregular shaped products better, faster, and at lower cost. Film Packaging Bul — Amsco Packaging Machinery Co., Inc., 31-31 48th Ave., Long Island City, N. Y.

Check 5192 opposite last page.

CESCO JR. DUMPERS

LIFTS and DUMPS

CESCO STOCK MODEL DUMPERS

BAGS • BOXES
DRUMS • BULK
REMOVABLE BOX TRUCKS
Loads Bins, Batchers and Mixers

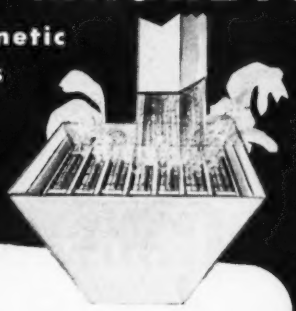
CESCO Jr. is a fast, lightweight machine that can handle seventy-five 400 pound loads per hour. It can be equipped as a multi-purpose machine with changeable skips for handling drums, bags, etc. or is available with any one skip for single purpose operation. Standard portable models dump at heights from 2 to 8 feet and stationary models dump at heights from 2 to 16 feet. Special models available for any height required. Cesco Jr. is powered by a ½ h. p. motor (3 phase or single phase) and features standard push button controls. For more details write for our free catalog.

ESSEX CONVEYORS, INC.
165 Franklin Avenue, Nutley 10, N. J., Dept. C
COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, California

Check 5193 opposite last page

DINGS GRATE MAGNETS

for positive, low-cost magnetic protection in trouble spots that are difficult to guard . . .



Under, over or in steep-sloped hoppers

Mounted in floor openings

Drawer type for vertical ducts

At discharge end of conveyors or spouts

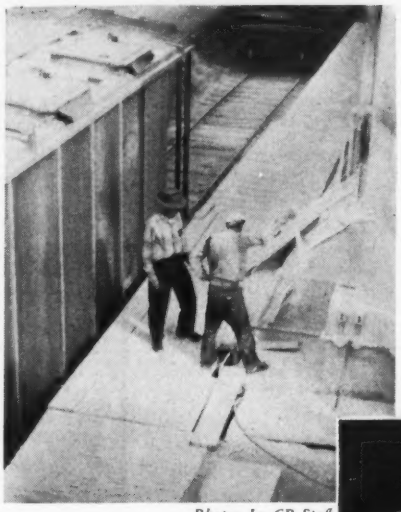
Dings Permanent Alnico Grate Magnets assure positive protection from tramp iron damage in trouble spots which never before could be effectively guarded. They are the only units of this type designed with unshielded magnets which contact the material directly to provide powerful attraction for fine particles of fuzz iron as well as larger pieces of tramp iron Recommended for powders and granular materials. Both wing and drawer types available in sizes and shapes for every need.

Write for details in Bulletin 1213A.

DINGS MAGNETIC SEPARATOR CO
4731 W. Electric Ave.
Milwaukee 46, Wis.
G-158½

Dings

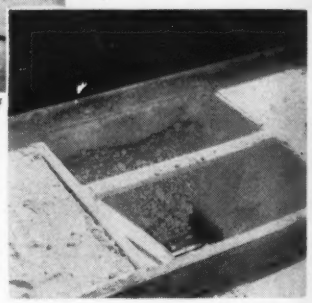
Check 5194 opposite last page



Unloading a hopper car of lime at Victor Chemical Works. Note absence of dust. Operation is easier, quicker with conveyor which carries lime under walkway to bucket elevator

Hopper feeds from bottom of car to conveyor belt which delivers material directly to bucket elevator

Photos by CP Staff



Lime unloading was unsatisfactory at Victor Chemical Works. Dust level was high and a lot of hand shoveling still had to be done. A belt-chain conveyor . . .

turns laborious lime unloading into easy, automatic job

THEODORE W. WETT, Assistant Editor
With **ED CONANT,** Plant Manager
Victor Chemical Works, Chicago Heights, Ill.

Problem: Lime unloading at Victor Chemical was a dusty, laborious job. Material was unloaded from box cars and dumped into a bucket elevator. Labor requirements were 1½ men for four to six hours for each car, with considerable clean up necessary of both car and surrounding area. Exposed operation between car and elevator was often hindered by inclement weather. Chances of loss were high.

Occasionally, particularly during hot summer months, mild cases of dermatitus resulted when lime dust mixed with perspiration. Protective clothing was then necessary which made the job even more uncomfortable.

Lime was used for food grade calcium phosphates.

Solution: In May 1957 Victor installed a conveyor to handle lime unloading. Crushed lime is received in covered hopper-bottom cars. About four cars per week are needed to satisfy operating requirements.

An excavation was made under railroad siding, connecting with bucket elevator about 18' away. Belt conveyor with positive chain drive was placed in excavation with a

hopper, approximating car hopper, installed to feed to belt from car bottom. Belt is 24" wide, rubber-covered, four-ply, 28-oz duck, protected by full-width, closely spaced 1 x ¼" steel flights. Belt-chain attachments of malleable iron every 5¼" hold belt and chain together. Steel flights on belt are bolted through chain belt attachments every 10½". Drive is from a 5-hp electric motor through fully enclosed, dust-tight, oil-bath, reducer unit. Flexible gum-rubber slashing strip eliminates seepage of material to inside of belt or chain. Capacity is approximately three tons per minute delivered directly to bucket elevator.

Results: Lime is now unloaded by process operator as part of his regular duties. No separate unloading crew is required. Dust has been virtually eliminated. Since entire operation is protected, adverse weather conditions do not interrupt unloading. Safety of personnel is increased because all moving equipment is removed from work area.

(Conveyor is a product of George Haiss Mfg. Co., Inc., Div. of Pettibone Mulliken Corp., 1212 E. Dominick St., Rome, N.Y.)

Check 5195 opposite last page.

Drum interlocking device cuts handling costs, saves space

Interlocking rolling hoops reduce transit damage also

Slightly offset rolling hoops — alternately raised and lowered — on opposite sides permit 55-gal steel drum to interlock with adjacent containers when any number are utilized or packed closely together. The new drum has been developed as a means of saving space and reducing handling and shipping costs. When unitized, a group of the new drums can be handled by a standard lift truck without the necessity of using wood pallets.

Transit damage to drums

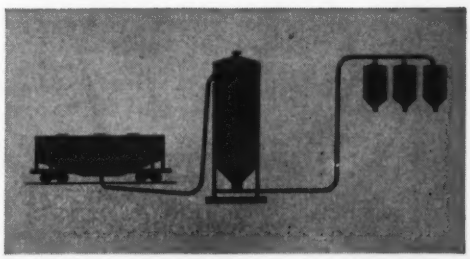
GOT TONS OF RESINS AND PLASTICS TO MOVE?

FULLER will do it better with air

Fuller offers you over 30 years of experience in designing and building pneumatic conveying systems for dry bulk materials . . . Fuller-Kinyon, Fuller-Fluxo, Airveyor® and F-H Airslide®.

Whether it's a comparatively simple operation of unloading a few tons of material an hour from car to storage, or the more complicated, automatic, remote-controlled in-plant system, or it can be tailored to your plant's requirements.

You too will find, as thousands of others have, that it is good economy to install Fuller pneumatic conveying systems for top sustained production at lowest operating costs. It will permit you to take full advantage of savings inherent in handling materials in bulk.



Write today for complete information.

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136 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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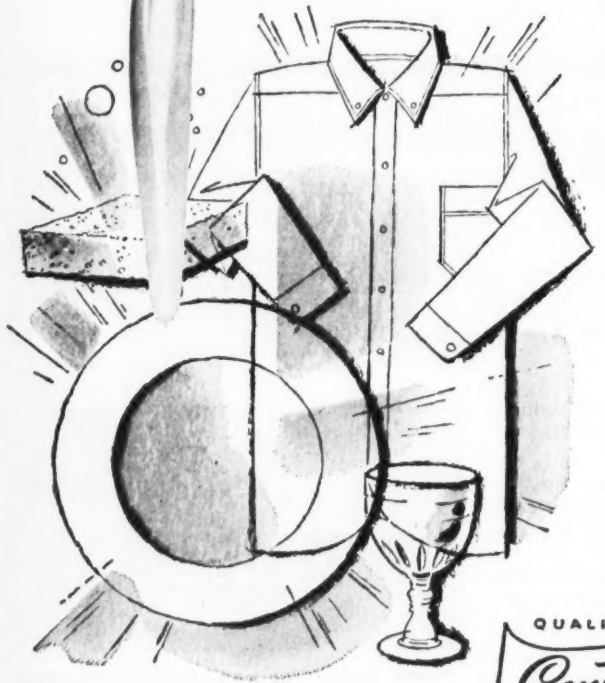
Check 5196 opposite last page

FLUID FLOW CANS BY CONTINENTAL

BEST FOR *Detergents,*

ammonia and

other household products



Whether your product is a detergent or some other household product, you'll clean up more sales when you give it the customer-pleasing advantages of Continental Fluid Flow cans. Look at these features!

No drip nozzle of polyethylene for free flow and exact dripless cutoff.

Wrap around lithography: Solderless construction leaves entire can (dome top, too) free for decoration with Continental's superb lithography.

Matchless beauty that lasts: Protected by a special varnish that prevents marring of lithography during display.

Unsurpassed product protection insured by specially developed enamel linings.

Colored nozzles to match or contrast with can design for added sales appeal.

Get the best can for your household products, *plus* Continental research and engineering service. Call Continental today.

QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

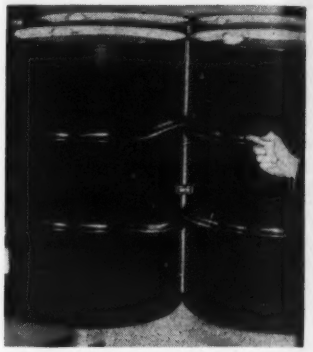
WIDEST RANGE OF SIZES!

Continental Fluid Flow cans are available in the widest range of sizes, every size you want to satisfy your customer's needs, from 12 oz. to one-half gal.

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 5595 Pare St., Montreal, Que.

Check 5197 opposite last page

can be sharply reduced because the unitized drums contact each other at their six strongest points, reducing denting and deformation. The rotation, vertical movement, and loosening, which often results in scuffing and surface damage on conventional drums, is minimized.



Rolling hoops on 55-gal steel drums provide unique interlocking that reduces handling and cuts shipping costs

Developed by the Signode Steel Strapping Company in conjunction with Vulcan Containers, Inc., the new containers cost no more than conventional 55-gal drums. Because they roll only on the hoops, they can be rolled straight and easily guided. The drums can be reconditioned and, if necessary, readily intermixed with standard drums. They are available with a variety of closures, accessories, and fittings, sanitary and corrosion-resistant linings, and can be decorated to meet individual requirements.

(Uni-Drum is available from Vulcan Containers, Inc., PO Box 161, Bellwood, Ill.)

Check 5198 opposite last page.

'Do-it-yourself' conveyors

Practical "do-it-yourself" installation workbook for users of power belt and gravity conveyors is contained in manufacturer's 20-page bulletin. Bul 500 — A. B. Farquhar Div., The Oliver Corporation, 150 North Duke St., York, Pa.

Check 5199 opposite last page.

THAT'S INTERESTING

Pat package

Standardization of packing containers for all shipping is aim of the American Standards Association. The group wants to cut annual $50- to $55-billion shipping charge by eliminating wasted space.

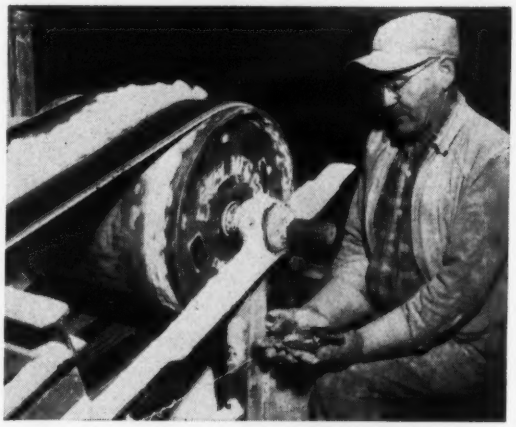
Plan is to make van containers, pallets, cargo containers in standards sizes whether carried by ship, train, or truck.

Cooling coat

There is a bit of Norton Co. now sailing in space, at least from a product standpoint. An aluminum oxide coating assists in controlling temperature of instrumentation inside the satellite "Explorer" now in space. Sprayed on in stripes along outside of the vehicle from nose cone to fourth stage rocket motor section, coating covers 25% of the forward shell. Striping keeps temperature range inside satellite between 50 and 86°F.

For more information on product at right, specify 5200 see information request blank opposite last page.

NO BOTTLENECKS FROM BOTTLE LIDS. At the Dlubak Glass Company plant in Tarentum, Pa., an Eriez Magnetic Pulley has replaced a slow and hazardous hand operation. Installed as the head pulley of a belt conveyor handling scrap glass, the magnet removes bottle caps and other tramp iron at the rate of 40-50 lbs. of metal from every ton of glass. Results: a saving of eight man-hours per day; increased production; improved plant safety; a higher quality of glass that is now completely metal-free.



STAR PERFORMER ON "WATCH MY LIME". An Eriez magnetic separator has all the answers to the tramp iron question at the Gibsonburg (Ohio) Lime Products Company. By removing all traces of stray metal including tiny fines from the lime line, the magnet prevents tramp iron from tearing the screens and mills. In addition, a sudden accumulation of fines on the magnet indicates the hammers on the hammermill have worn and need to be changed, thus avoiding damage to this equipment. The company states the magnet paid for itself in a few months by the savings it produced.

TUG TEAM TANGLES WITH TOUGH MAGNET! No matter how hard this team tugs it won't be able to pull the magnet from the girder. The powerful magnetic strength of Eriez magnets, combined with permanent dependability, has found widespread acceptance in American industry. In processing lines of all kinds Eriez magnetic separators are used to remove tramp iron that causes fires, machinery damage and product contamination. *All Eriez magnets are non-electric, self-contained. They operate without any wires or attachments. Their magnetic strength lasts a lifetime; first cost is the only cost.*

MAGNETIC IDEAS FROM ERIEZ

ERIEZ HI-POWR® MAGNETIC SEPARATORS

ERIEZ HI-VI® VIBRATORY EQUIPMENT

Here's why ERIEZ magnets are a "money saving" investment

- *They often pay for themselves in a very short time by reducing direct labor costs.*
- *They require no operating or maintenance costs; and reduce maintenance costs for other equipment.*
- *They increase production.*
- *They improve the quality of the product.*
- *They increase plant safety standards.*
- *They are easily installed on new or existing equipment.*

Learn how Eriez "Magnetic Ideas" can help you. Our factory-trained field men, backed by extensive laboratory and engineering know-how, will study your particular problem, make a plant survey and offer helpful "Magnetic Ideas". Write or phone Eriez Manufacturing Company, 73E Magnet Drive, Erie, Pa.

Lightweight fiber drum features easier liquid dispensing

Polyethylene liner is integral part of drum

Uses: Container for liquid and semi-liquid products.

Features: Locking device makes drum simple to open and reclose, with full-open top for easier dispensing of contents. Polyethylene lining is built-in as an integral part of drum. Insulated fiber sidewall, highly efficient barrier against transmission of heat, protects product from sudden temperature changes during transit or in storage. Light tare weight provides economies through reduced handling weight.

Description: Fiber drum incorporates liquid-tight bottom crimp, heavy-duty electro-galvanized top and bottom chimes, and either a vinyl- or epoxy-coated metal cover available with or without bungs and vents. Uniform size provides easy handling, stacking, and palletizing. For corrosive products, the top metal chime can be protected with a polyethylene sleeve heat-sealed to the lining.

("Liquipack" fiber drum is product of Fibre Drum and Corrugated Box Div., Continental Can Company, 530 Fifth Ave., New York 36, New York.)

Check 5201 opposite last page.

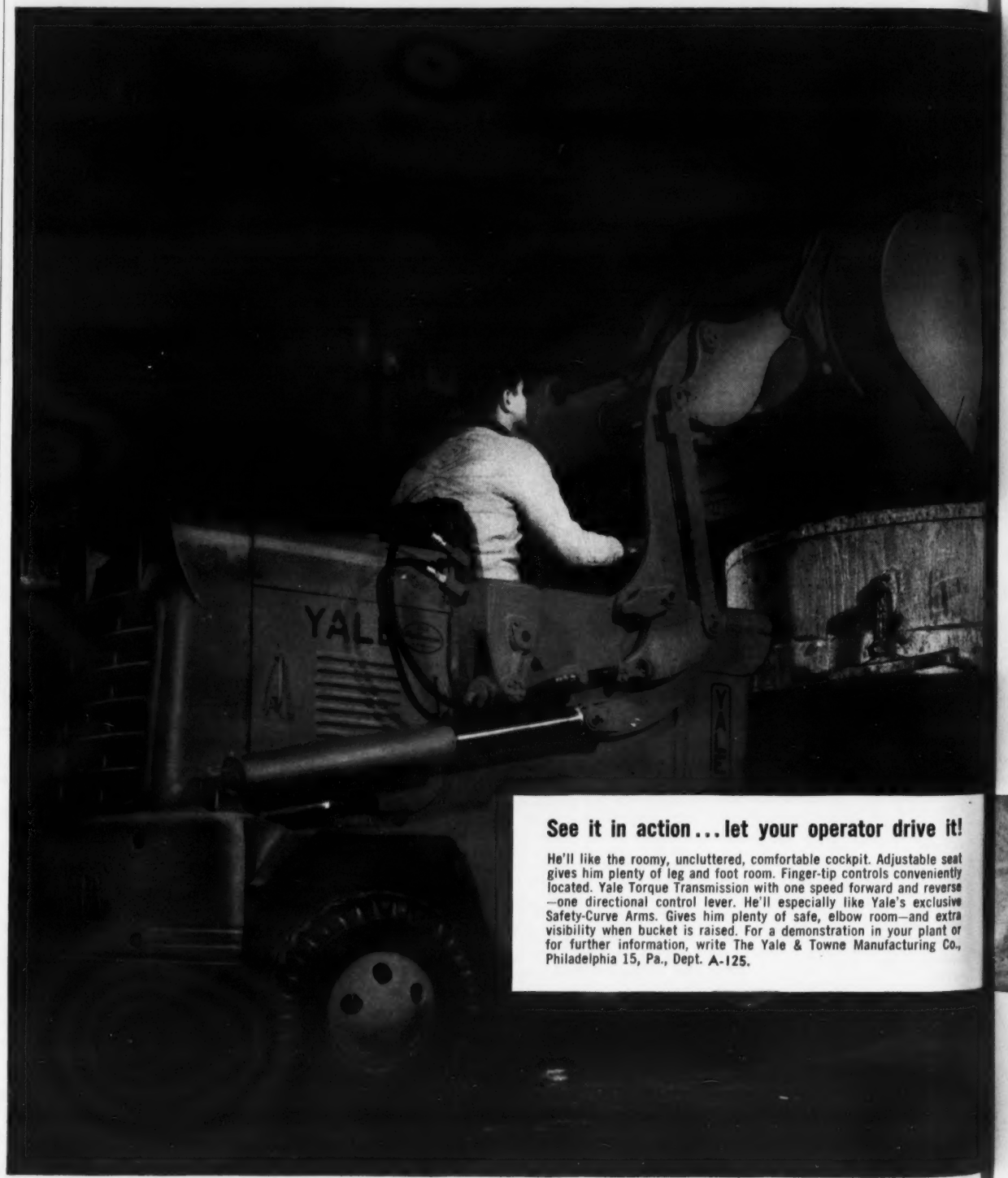
Develops horizontal unit to add greater flexibility to Airslide systems

An Airslide has been developed to horizontally convey fine, dry materials in plants with limited head room. Previously, the Airslide which uses small amounts of air to convey large amounts of material required some slope.

Utilizing a series of high-capacity fluidizing floor courses connected by elevating passageways, the horizontal fluidizing conveyor can be arranged to avoid obstructions in the path of the conveyor either by conveying the material around an object or by

YALE introduces...the INDUSTRIAL tractor shovel

DESIGNED TO GIVE YOU 25%



See it in action... let your operator drive it!

He'll like the roomy, uncluttered, comfortable cockpit. Adjustable seat gives him plenty of leg and foot room. Finger-tip controls conveniently located. Yale Torque Transmission with one speed forward and reverse—one directional control lever. He'll especially like Yale's exclusive Safety-Curve Arms. Gives him plenty of safe, elbow room—and extra visibility when bucket is raised. For a demonstration in your plant or for further information, write The Yale & Towne Manufacturing Co., Philadelphia 15, Pa., Dept. A-125.

MORE WORK EVERY HOUR

through these exclusive Yale features . . .

- Yale Torque Transmission (fully automatic)
- 45° ground-level bucket tipback
- Safety-curve arms
- Accelerates to operating speed of 8 mph. in 3.5 seconds—to a speed of 13 mph. in 5.5 seconds
- 6 foot dumping clearance
- Sealed brakes
- Front and rear operating lights

At last—a tractor shovel designed especially for industry! Whether you handle bulk chemicals, sand, gravel, scrap or raw materials, you'll get more productive work at less cost per work unit with this new concept in a tractor shovel.

Yale designed it for tight areas—built it *compact* (only 117" overall length) so that it can maneuver in any aisle wide enough for a wheelbarrow. *Accelerates to an operating speed* of 8 mph. in 3.5 seconds and to a top speed of 13 mph. in 5.5 seconds. Exclusive *Yale Torque Transmission (fully automatic)* permits quicker, smoother starting, eliminates shifting, provides more power under load conditions—in a word, *speeds cycle operations.* This extra speed, plus the greatest carrying capacity of its class (full 2500 lbs.) means *up to 25% more work per hour.*

Yale's loader-linkage design offers unique advantages. Exclusive 45° *Ground-Level Tipback* insures the ultimate in loading action—and a grade-level carrying position to minimize spillage. Exclusive 6 foot *Dumping Clearance* is highest on any model of similar wheelbase. Bucket is *Automatically Self-Locating.* Operator merely lowers from full dump-position to ground-level—bucket automatically returns to digging position.

a product of Yale's integrated design—these engineering advances are standard features

- Gasoline; LP-Gas powered
- Sealed hydraulic system—keeps dirt out
- Pre-cleaner—air cleaner combination
- Extra strong heavy welded steel frame—greater safety, longer life
- Automatic bucket return to digging position
- Carrying capacity of 2500 lbs.—bigger load capacity
- Short wheel base—minimum turning radius
- Sealed generator and distributor
- Balanced weight distribution
- Maximum speeds up to 13 mph.

YALE*
*REG. U.S. PAT. OFF.
YALE & TOWNE

INDUSTRIAL LIFT TRUCKS & TRACTOR SHOVELS • HOISTS

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • INDUSTRIAL TRACTOR SHOVELS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

Check 5202 opposite last page

elevating the material over it in successive elevating steps.

Heart of conveyor is elevating passageway. These extend upwardly from the lower or downstream end of each floor course to just above the higher or upstream end of the next floor course.

Each floor course is made up of an upper and lower channel separated by a special porous fabric rigidly mounted in an enclosed conveyor housing. Bulk material in upper channel is supported by the fabric. When air at low pressure is introduced into lower channel it permeates the special porous fabric so that the material in upper channel becomes fluidized and flows under force of gravity.

When fluidized material reaches elevating passageway at the end of course, a greater flow of compressed air produces a greater degree of aeration and a consequent expansion and elevation of material in the passageway. This expansion causes material to rise upwardly through passageway and flow over onto upper end of next floor course. Material then passes serially over remaining floor courses and through elevating passageways to discharge.

Readily installed without plant redesign, the horizontal unit will convey such fine material as gypsum, soda ash, barite, bentonite, hydrated lime, alumina, fly ash, and iron ores.

(Horizontal Airslide is manufactured by Fuller Co., Catasaqua, Pa.)

Check 5203 opposite last page.

Fork truck safety tips

Manufacturer's eight-page bulletin contains tips on operating fork lift trucks more safely. Illustrated with a series of cartoon-type drawings, booklet points out specific safe operating practices and serves as guide in setting up fork truck driver training course. Fork lift trucks safety tips — Lewis-Shepard Products, Inc., Dept. R-23, 125 Walnut St., Watertown 72, Mass.

Check 5204 opposite last page.

GAYLORD TRIMS
YOUR PACKAGING COSTS

Gaylord's approach to packaging doesn't stop with the corrugated box itself. We take a fresh look at your entire packing and handling cost picture, then tailor a program to your exact measure.

Regular cartons in big volume . . . engineered packaging . . . your nearby Gaylord man knows both. And he is cost-conscious either way.

GAYLORD CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

PROBLEMS?

Interested in solving them? Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each . . .

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

These "New Solution" stories appear in the "New Solutions" section which begins on page 57 of this issue.

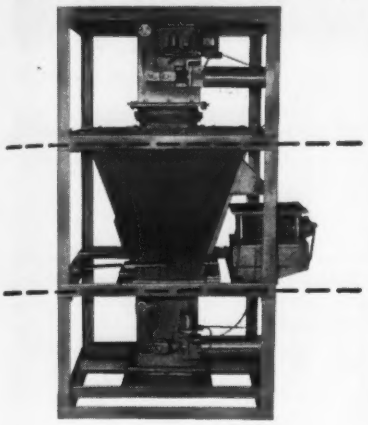
This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few. This issue may contain the answer you need.

For more information on product at left, specify 5205 see information request blank opposite last page.

THE W-C HOPPER SCALE



standardized components adapt it to a full range of material handling methods, control instrumentation

Take a good look at this hopper scale. It has many practical features for almost any weighing application.

Take the upper and lower frames. They are designed to accommodate many standardized feed and discharge components: sliding gates, vibratory feeders, screw feeders and others. These units are pre-engineered; their performance has been fully proven in use. Costs are, therefore, correspondingly lower. Satisfactory operation is confirmed in advance.

Now look at the middle or hopper frame. Note the flexure mountings. They give stability to the unit and deliver a single component of force to the weight transmitter regardless of load distribution. The transmitter, itself, may be either electric or pneumatic; the signal can be used for weight indication, recording, automatic batching.

Write for Catalog 12. Clear text, lots of pictures.

W-C

S.A. 1659

WEIGHING and Control COMPONENTS, Inc.
206-A Lincoln Ave., Hatboro, Pa.

Check 5206 opposite last page

Short, rigid, lift arms . . .

. . . pivoted forward of operator's position is one of the operating and safety features incorporated in four-wheel drive, rear-wheel steer, tractor-loader in 1¾-cu-yd class. Center of gravity and extra-wide wheel tread (74¾") are said to give the tractor-loader exceptional side-stability as well as longer forward reach in all positions. (Forward reach at 7' dump height is 62½".)

Location of lift-arm pivot and elimination of all linkage in back of bucket, offer important safety advantages since operator has unobstructed visibility in all directions and can easily get on or off machine regardless of whether boom is up or down. There is no danger of operator's arm being caught in lifting mechanism.

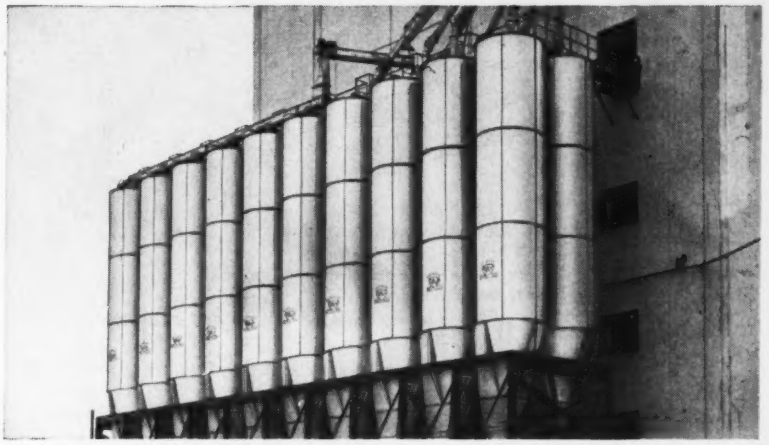
A 42.5-gpm hydraulic pump, operating at 1800 rpm, gives tractor-loader a breakout force of 11,000 lb at ground level, and lifting capacity of 5500 lb with bucket in carry position. Hydraulically operated transmission has three speed ranges from 0 to 21 mph, with full power-shift in all speeds. W-9 Terraload'r is product of J. I. Case Co., Racine, Wisconsin.

Check 5207 opposite last page.

"There we are . . . that'll sure save us a trip."

DAY

BULK STORAGE NEWS



A battery of 20 DAY vertical bulk storage tanks serving packaging line as well as truck and rail car loading operation. Each tank section holds approximately a carload of ingredients.

DAY BULK STORAGE TANKS

No other method stores bulk materials at lower cost

SAVINGS is one of the big advantages of DAY bulk storage and material handling equipment. Typical reports from DAY bulk tank owners tell of savings from 25¢ to 35¢ per hundred pounds of material handled. With DAY tanks, you save container or bag costs, you save labor, you save storage space and you save "invisible loss" because there's no spillage or breakage. DAY tanks improve plant efficiency and keep costs down.

For the most complete line of economical bulk tanks in vertical and horizontal styles, turn toDAY, now. Increase your plant's operating efficiency, lower material handling costs, improve sanitation and housekeeping with DAY bulk tanks. Free bulletin tells how to handle bulk material at lower cost with DAY units. Write toDAY for Bulletin 574.

For DAY office nearest you refer to our advertisement in Chemical Engineering Catalog.

The DAY Company

SOLD in UNITED STATES by
The DAY SALES Company
852 Third Ave. N.E., Minneapolis 13, Minn.

DAY SINCE 1881

MADE and SOLD in CANADA by
The DAY Company of Canada Limited
26 Brydon Drive, Rexdale (Toronto), Ontario

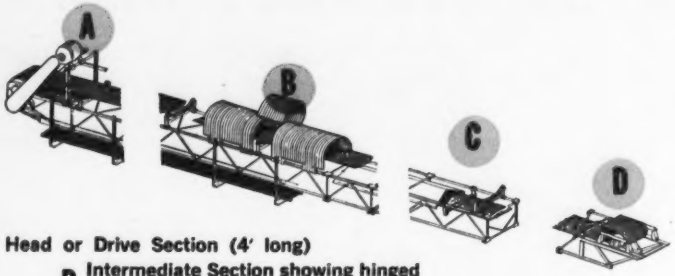
Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

Check 5209 opposite last page

NEW IDEA in prefabricated belt conveyors

JOY READY-SPAN tubular design requires no special engineering



A Head or Drive Section (4′ long)

B Intermediate Section showing hinged cover (20′ –8′ –4′)

C Intermediate Section showing optional return belt cover

D Tail section showing takeup and belt plow (4′ long)

Just tell us the length, the speed, and the material you want to move and we can pull a Ready-Span prefabricated conveyor "off the shelf" for you. You'll get all the economies of pre-engineering plus all the advantages of a conveyor installation tailored to your needs.

Here's how it works: each section, including drive and tail terminals, is made up of four pipes connected by pipe diagonals forming a lace framed truss. Sections bolt together to form a straight, rigid, pipe frame truss.

All accessories—idlers, walkways, cover decking, hoods and supports clamp to the pipe anywhere you wish—without burning holes or using pre-arranged multiple holes that weaken the conveyor.

The Joy Ready-span is available in a variety of drive and take-up combinations for any standard belt width. Promptly available from stock to meet almost any handling condition.

Write for Bulletin 218-80

NEW IDEA in conveyor belt idlers

JOY LIMBEROLLER

Write for Free Bulletin 218-80A

Radically different from all other idlers, the Limberoller is a single roll idler consisting of neoprene discs molded to a flexible steel cable. The entire idler turns on its own axis. (1) Only two bearings are used, one at either end, up out of the dirt. (2) The idler supports the belt across its entire width . . . eliminates gaps left by ordinary 3-roll idler. This even support, combined with cushioning "no-bump" action of neoprene discs, can increase belt life 6 times and more. The Limberoller can be installed on *any* belt conveyor, even on existing conveyors.

WSW L6967-210

JOY *Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*

In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

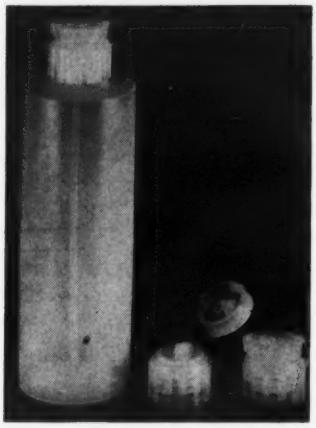
Check 5210 opposite last page

PACKAGE IDEAS

Added convenience . . .

. . . has been given to polyethylene squeeze bottles through introduction of a hinge cap. This polyethylene closure allows fluids to be dispensed without being separated from body of bottle.

Top portion of closure is attached to rest of cap by strip of flexible polyethylene. Cap



is designed to produce a fine spray at an appropriate angle. Dimensions of inner spray tubing may be changed to dispense proper sprays.

New closure is suitable for use with standard cylinder, oblong or oval polyethylene bottles. Hinge cap is manufactured by Plastic Container Division of Continental Can Company, 100 E. 42nd St., New York 17, N.Y.

Check 5211 opposite last page.

Non-drip neck . . .

. . . permits easy, accurate pouring of "Carb Master" carburetor and fuel line conditioner into automobile gasoline tanks or carburetor tubes. The round, 16-ounce-lithograph-labeled can replaces a square-shouldered can.

"Carb Master" manufacturer, Rust Master Chemical Corp., reports that round can resists more abuse in shipping and occupies less shelf space than its former package. Lithographed label, printed in red, yellow, and black, gives high visibilty in shelf or window displays. "Accu-Por" cans are manufactured by American Can Company, 100 Park Ave., New York 17, N.Y.

Check 5212 opposite last page.

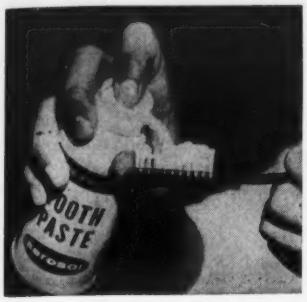
Printed-dome top . . .

. . . is feature of 12-ounce aerosol can, originally developed for Reddi-Whip, Inc., but now available in all product lines. Printed dome offers additional package decoration and merchandising possibilities. With this new technique, it is now possible to have a container with complete, overall color lithography for maximum consumer eye-appeal.

Use of "log-roll" printing on portion of label can provide good product identification when package is laid down in dispenser racks. "Spra-tainer" with printed dome is manufactured by Crown Can Division of Crown Cork & Seal Co., 9300 Ashton Rd., Philadelphia 36, Pennsylvania.

Check 5213 opposite last page.

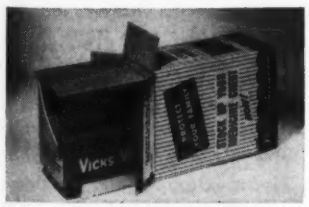
Push-button toothpaste . . .



. . . packaged in an aerosol can has been introduced in test markets by the Rexall Drug Co. Dispensing of paste in its original unaerated form is made possible with compressed nitrogen gas as propellant. Aerosol toothpaste has advantages of being laid directly on brush with no concern for removal or replacement of caps. Complete protection and sterility in container is maintained. Label remains in full view without distortion throughout container's existence. No carton is necessary in final packaging to consumer. Aerosol toothpaste is being filled and packaged by Aerosol Techniques, Inc., Bridgeport, Conn.

Check 5214 opposite last page.

Don't throw away shipping box!



. . . It's part of the display. This combination shipper-display unit being used by Vick Chemical Co. to group related items and to tie-in new products with its well-established lines can be assembled into an aisle display stand in seconds. Inner package can be used alone as counter display unit. Shipper-display units are manufactured by Hinde & Dauch, Sandusky, Ohio.

Check 5215 opposite last page.

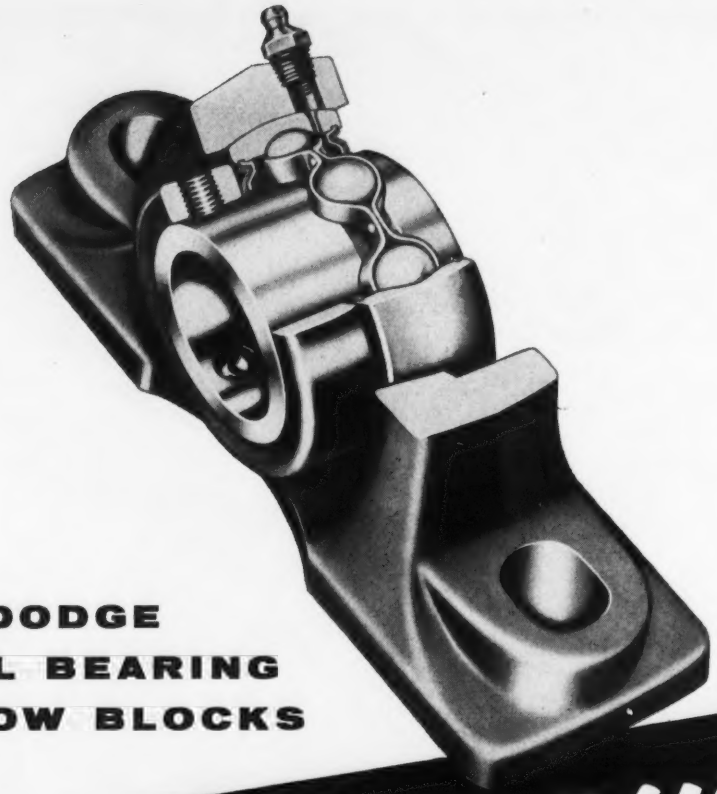
THEY'RE ALL ROBO-WRAPPED! Blumenthal Raisinettes and Goobers, Federal Plastic Tableware, Perm-O-Seal, Schrafft's Gums and Jellies, Chunky Chocolate Squares, Tom's Corn Cheez, General Mills Wheaties and Cheerios, Kraft Miniature Marshmallows sample package.

FORM, FILL, SEAL AUTOMATICALLY
PILLOW-PACKAGING CUTS COSTS

Does your product belong in this picture? It does if automatic packaging can save you money. Doesn't matter whether you package solids, powders, granules or liquids . . . Robo-Wrap heat seals them in a single or double wall of cellophane, paper, polyethylene, Foil Laminates, Mylar or Saran. Hand-over-hand method forms, fills and seals packages from a continuous roll for highest efficiency. Robo-Wrap changes package size quickly, too. Write for booklet that gives facts on low maintenance and higher efficiency.

LYNCH ROBO
CORPORATION
A Subsidiary of
LYNCH CORPORATION
Anderson, Indiana

Check 5216 opposite last page



DODGE
BALL BEARING
PILLOW BLOCKS

PRECISION BUILT
– for normal and medium duty jobs

SC

NORMAL DUTY
SHAFT SIZES—1/2" to 2-7/16"

SCM

MEDIUM DUTY
SHAFT SIZES—1-7/16" to 3-1/2"

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

★ High quality at moderate cost.

★ Deep groove ball bearing provides high radial and thrust capacity.

★ Long inner race distributes load over greater shaft area.

★ Metal backed synthetic seals are locked in position. They can't blow. Effectively exclude dust and dirt.

★ Completely sealed both on and off the shaft.

★ Fully self-aligning.

★ Rugged one-piece semisteel outer housing.

Pillow blocks, flange bearings, piloted flange bearings, cylindrical units, hanger bearings, screw conveyor hanger bearings.
Call your local Dodge distributor — or write us for technical bulletin.

DODGE MANUFACTURING CORPORATION, 6200 Union St., Mishawaka, Ind.

DODGE
of Mishawaka, Ind.

Check 5217 opposite last page

Rugged dumping device operates hydraulically, handles two-ton loads

Uses: For dumping heavy loads where no lifting is required.

Features: Simply by pushing lever, one man can easily dump heavy loads.

Description: Hydraulically operated pivot dumper can handle skid boxes, pallet boxes, drums, barrels, and special in-plant containers with loads up to 4000 lb. Installation is permanent. Dumping action is powered by two large hydraulic cylinders. An electric motor actuates hydraulic system, which features an overload safety valve, and hydraulic fluid level gage.

Sturdy, hydraulically operated pivot dumper handles loads up to two tons

Unit is set in motion by pushing a manually operated lever forward. Dumper pivots smoothly 135° and stops itself when dumping angle of 45° is reached.

By pulling lever back, dumper can be automatically returned to loading position.

("Hydro-Dumper" is product of Essex Conveyors, Inc., PO Box 27, Nutley, N. J.)

Check 5218 opposite last page.

'Skads' of skids

Manufacturer's catalog includes full specifications and construction data on skids, skid boxes, sectional bins, and semi-live skid systems. Cat LS-58 — The Lanham Co., 20 South 7th St., Keokuk, Ia.)

Check 5218A opposite last pg.

ARE YOU LOOKING . . .

for more information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

Then make use of the Reader Service slip opposite the last page of this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

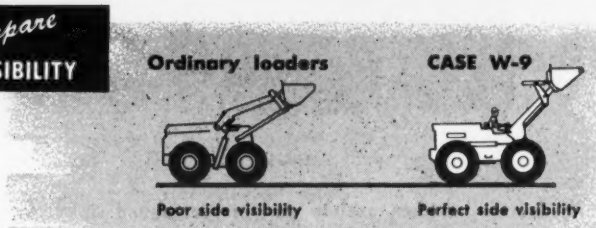
Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.

For more information on product at right, specify 5219 see information request blank opposite last page.

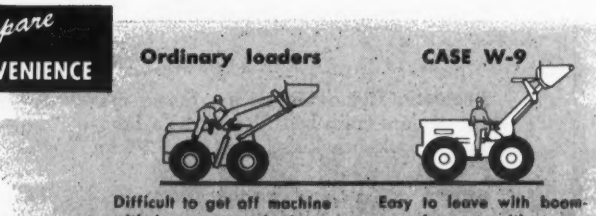
Let us show you how the CASE® W-9 can cut your costs

Compare VISIBILITY



Compare OPERATOR SAFETY

Compare CONVENIENCE



No matter what make of *4-wheel-drive* loaders you may own now — or are thinking of buying — it will pay you to *compare them side by side* with the new Case W-9 Terraload'r.

Field tests already have shown that this new Case-built, Case-powered loader can *dig more, carry more, dump faster — and with greater safety to the operator* — than competitive loaders costing as much as $1000 more. Best of all, the Case W-9 gives you a choice of 3 quick-change buckets — *1¼ cu. yd.* for heavy-duty digging, *1¾ cu. yd.* for standard materials; and *2¾ cu. yd.* for light materials — heaped capacities.

Remember, the *only* way to compare is to *see the W-9 in action* at your Case Industrial Dealer's — or mail coupon below for a free demonstration *on your own job.*

MAIL FOR FREE DEMONSTRATION

J. I. CASE CO., Dept. E1548
Racine, Wisconsin, U.S.A.

☐ I'd like to see a demonstration of the W-9 Terraload'r (no obligation, of course)

☐ Send free descriptive catalog

Name ..... Title.....

Company .....

Address .....

City ..... State .....

CASE
1st in quality for over 100 years

INDUSTRIAL WHEEL AND CRAWLER TRACTORS
LOADERS • DOZERS • BACKHOES • ENGINES

NOW! Immediate delivery on low-cost ultrasonic cleaning equipment you can afford!

Prices start at only $175.00— with a full two-year warranty

Series 600
$350

narda
SONBLASTER

Now, thanks to Narda's mass production techniques, you can get top ultrasonic cleaning equipment with a full two year guarantee, at the lowest prices in the industry! What's more, Narda's SonBlasters are available now — off-the-shelf — for immediate delivery! Here's your opportunity to start saving immediately on labor, chemicals and floor space — not to mention improved cleaning with fewer rejects.

Simply plug this new Narda SonBlaster into any 115 V-AC outlet — fill the tank with the cleaning solution of your choice and flip the switch. In seconds, you are cleaning everything from hot lab apparatus to medical instruments, optical and technical glassware to clocks and timing mechanisms, electronic components and semiconductors to motors, relays and bearings. In short, you will clean 'most any mechanical, electrical, electronic or horological part or assembly you can think of—and clean it faster, better and cheaper. In addition, Narda SonBlasters are ideal for brightening, polishing, decontaminating, sterilizing, pickling, and plating; emulsifying, mixing, impregnating, degassing, and other chemical process applications.

Write for more details now, and we'll include a free questionnaire to help determine the precise model you need.

Narda SonBlasters—a complete line of production-size units with the quality, power, performance, capacity and appearance of cleaners selling up to three times the price. From $175 to $1200.

Fill out and mail for full information

SPECIFICATIONS

Inside tank dimensions: (Model NT-602) 9¼" l, 6" h, 5" w; one gallon capacity; stainless steel. **Generator:** 10" l, 8½" h, 9½" w; 115 V-AC; Selector switch for alternating between two tanks. **Complete unit is portable and compact.**

NARDA ULTRASONICS CORP.
Herricks Road, Mineola, L.I., N.Y.
Dept. CP-2

Please send me more information about Series 600 SonBlasters.

Name_____

Organization_____

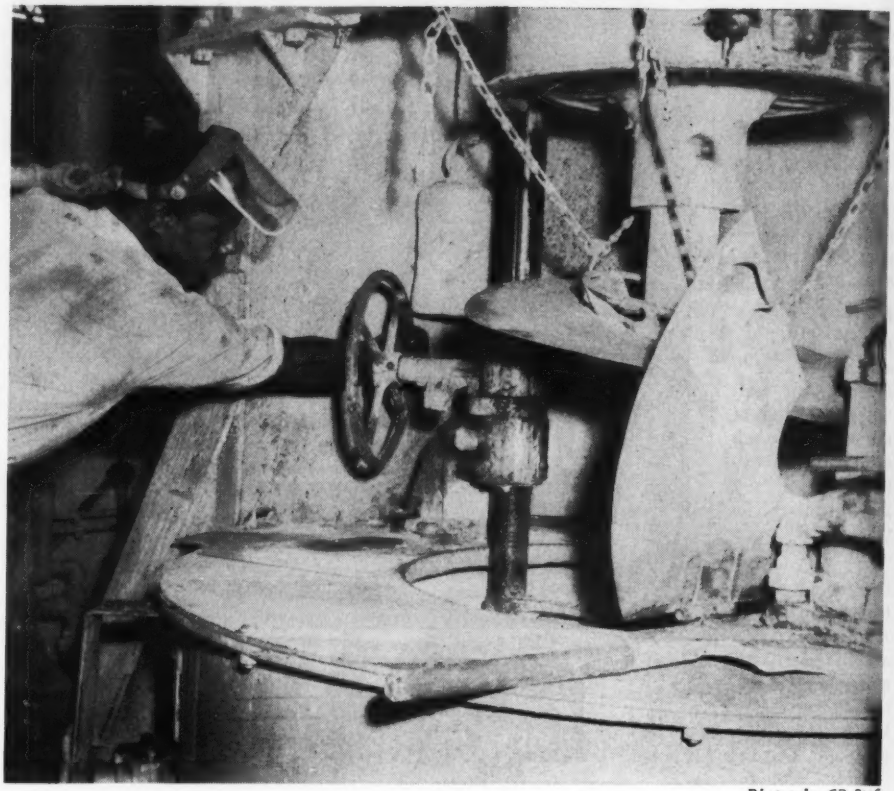
Address_____

City_____ Zone____ State_____

the narda ultrasonics corporation
HERRICKS ROAD, MINEOLA, L. I., N. Y.
Subsidiary of The Narda Microwave Corporation

Check 5220 opposite last page

CP **PROCESSING EQUIPMENT**



Photos by CP Staff

Calcium oxalate slurry is dense and sticky. Shoveling wet filter cake from bed filters was an arduous task. Now at Victor Chemical Works . . .

centrifuge cuts work in handling sticky slurry

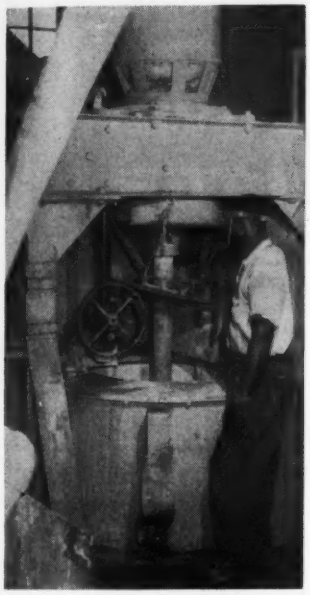
THEODORE W. WETT, Assistant Editor
With **ED CONANT,** Plant Manager
Victor Chemical Works, Chicago Heights, Ill.

Problem: Removing sticky, dense calcium oxalate from bed filters was a laborious, "back-breaking" job at Victor Chemical Works.

Slurry of calcium oxalate was transferred from reactor to filter where it was washed several times with water drawn off by vacuum. Filter step serves to remove impurities, such as unreacted raw materials, prior to further processing to oxalic acid. Acid is used as a reducing and bleaching agent in tanning and also as chemical intermediate.

Solution: In July 1955, Victor installed two, 48-inch, direct-drive, suspended centrifuges to clarify calcium oxalate slurry. Slurry is fed to units through a four-inch feed pipe. Wash water is added through a one-inch spray pipe. Counterbalanced unloader, controlled by a single handwheel, is used for removing solids from basket. Solids pass through central discharge opening in bottom to a continuous moving belt which feeds them to

◀ Operator unloading calcium oxalate from centrifuge. Unit provides better washing using less water than bed filters formerly used



One of two centrifuges which replaced 12, 5×12' bed filters. Units take up only ½ the space and have eliminated high labor costs

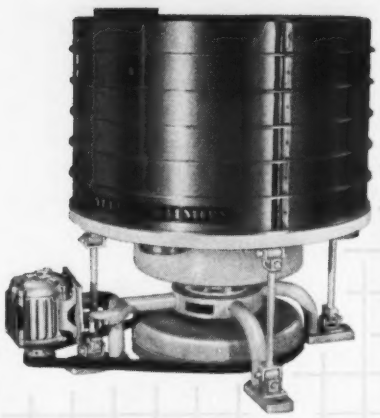
reslurry tank for further processing.

Drive is direct-connected, two-speed (900 and 450 rpm), totally enclosed, fan-cooled motor. Basket is all welded steel, 48″ in diam, 24″ deep with 24″ diam discharge opening.

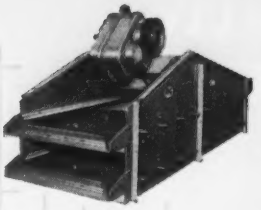
Results: Handling costs have been reduced. Washing is more efficient, even with smaller water consumption. Only about one-half the floor space is now being used compared to that formerly required for bed filters. A third unit has recently been installed to handle increased production.

(Batch-type centrifugals were supplied by Tolhurst Centrifugals Div., American Machine & Metals, Inc., East Moline, Illinois.)

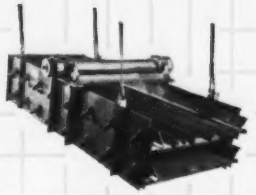
Check 5221 opposite last page.



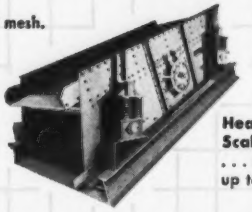
Stainless Steel Gyratory Screen
. . . for size classifications 2 to 325 mesh.



Horizontal Screens
. . . for separations up to 2½ inches.



Small Inclined Screens
. . . for separations 1½ inches to 40 mesh.



Heavy Duty Scalping Screens
. . . screen apertures up to 12 inches.

SCREENS

world's widest line!

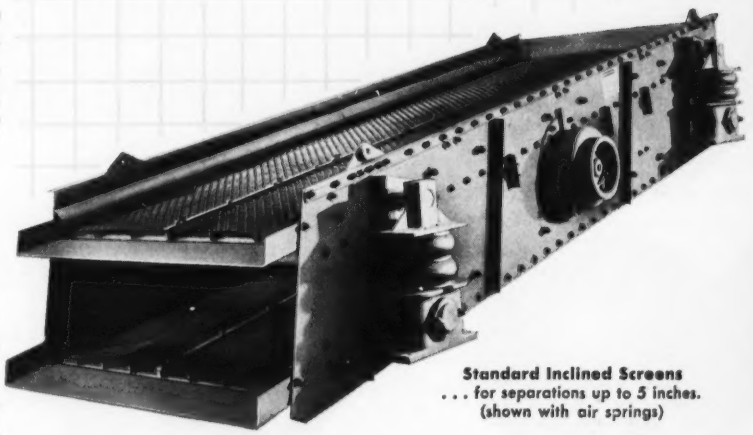
. . . From smallest to largest

. . . Separations from 12 inches to 325 mesh.

Allis-Chalmers not only offers you the most complete line of screens, but also provides the skilled helpfulness of experienced application engineers and modern laboratory facilities for running tests, if tests are necessary.

- Suspended or floor mounted, or supported on air springs.
- Inclined or horizontal.
- Specially built screens for any application.
- Wet or dry operation.
- Screens for hot materials handling.
- Dust-proof enclosures.
- Heated decks for fine moist materials. Also mechanical anti-blinding device.
- And you can get your screen complete with motor, drive and control — all from one manufacturer!

For valuable screen selection guide, 26C6177M, write direct to Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.



Standard Inclined Screens
. . . for separations up to 5 inches.
(shown with air springs)

ALLIS-CHALMERS

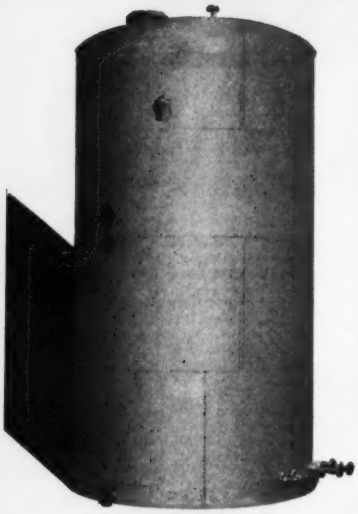
A-C ALLIS-CHALMERS

A-5583

Check 5222 opposite last page

ALLOY

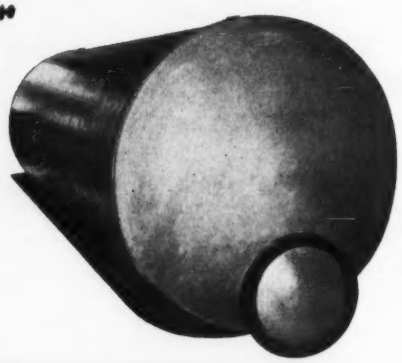
TANKS for INDUSTRY



For more than four decades Brighton has fabricated equipment for the processing industry. From our modern and completely equipped plant, Brighton craftsmen build small tanks, large tanks, special tanks from all types of alloy metals.

Typical fabricating jobs include: fractionating columns, reactors, pressure vessels, (jacketed or unjacketed) coils, agitators, kettles, tanks, evaporators. Special machines weld, bend, flange, roll and form.

Brighton fabricates according to ASME code requirements. For creative engineering, craftsmanship and on time delivery of equipment, write for complete information. Prompt estimates on your fabrication requirements.



BRIGHTON

METALSMITHS EST. 1914

CORPORATION

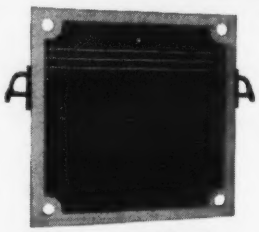
820 STATE AVENUE · CINCINNATI 4, OHIO

Check 5223 opposite last page

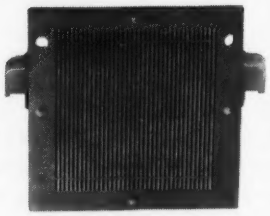
DESIGNED TO PROTECT PRODUCTION

Large filter press with rubber-covered cast iron plates and frames.

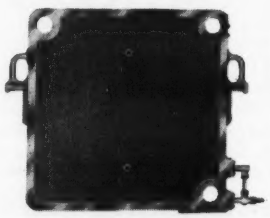
SHRIVER FILTER PRESSES



Polyester plate fiberglas-reinforced.



Solid rubber plate.



Stainless steel plate.

Are Made to Protect
- The Equipment
- The Purity of Product

To meet any corrosive, abrasive or other conditions during filtration which may be destructive to equipment or harmful to purity and quality of the material being processed, Shriver Filter Presses can be supplied with plates and frames.

1—Of cast iron or aluminum coated with polyvinyl chloride or other resins, or with rubber.

2—Of solid rubber, glass-reinforced polyester, Haveg, stainless steel or other alloys.

The factors of suitability, first cost, strength and available filtering area must be considered specifically for each application.

We'll be glad to consult with you on the best means of "protective" filtration.

T. SHRIVER & COMPANY, INC.

846 HAMILTON STREET • HARRISON, N. J.

SALES REPRESENTATIVES IN: Decatur, Ga.—Houston, Tex.—Livonia, Mich.—St. Louis, Mo. San Francisco, Cal.—Montreal, Que.—Toronto, Ont.

FILTER PRESSES · VERTICAL LEAF FILTERS · FILTER MEDIA
HORIZONTAL PLATE FILTERS · CONTINUOUS THICKENERS
SLAB FORMERS · DIAPHRAGM PUMPS · ELECTROLYTIC CELLS

Check 5224 opposite last page

Low-cost pneumatic pump handles variety products at 100 lb/min rate

Has no moving parts, operates on 10 to 35 psi air

Uses: Pumping or mixing pulverized chemicals, clay, flour, starch, and similar products. Unit will also mix and pump fluid materials such as glue, hot asphalt, and heavy slurries of various compounds.

Features: Pneumatic mixer-pump operates on any plant's existing compressed air supply, requiring only 10 to 35 psi air to function efficiently. Average flow of most pow-

Pneumatic mixer-pump has no moving parts, operates on plant's air supply

dered materials through unit is 100 lb per min. Machine is low cost, does not require auxiliary blowers, and has no moving parts to wear out.

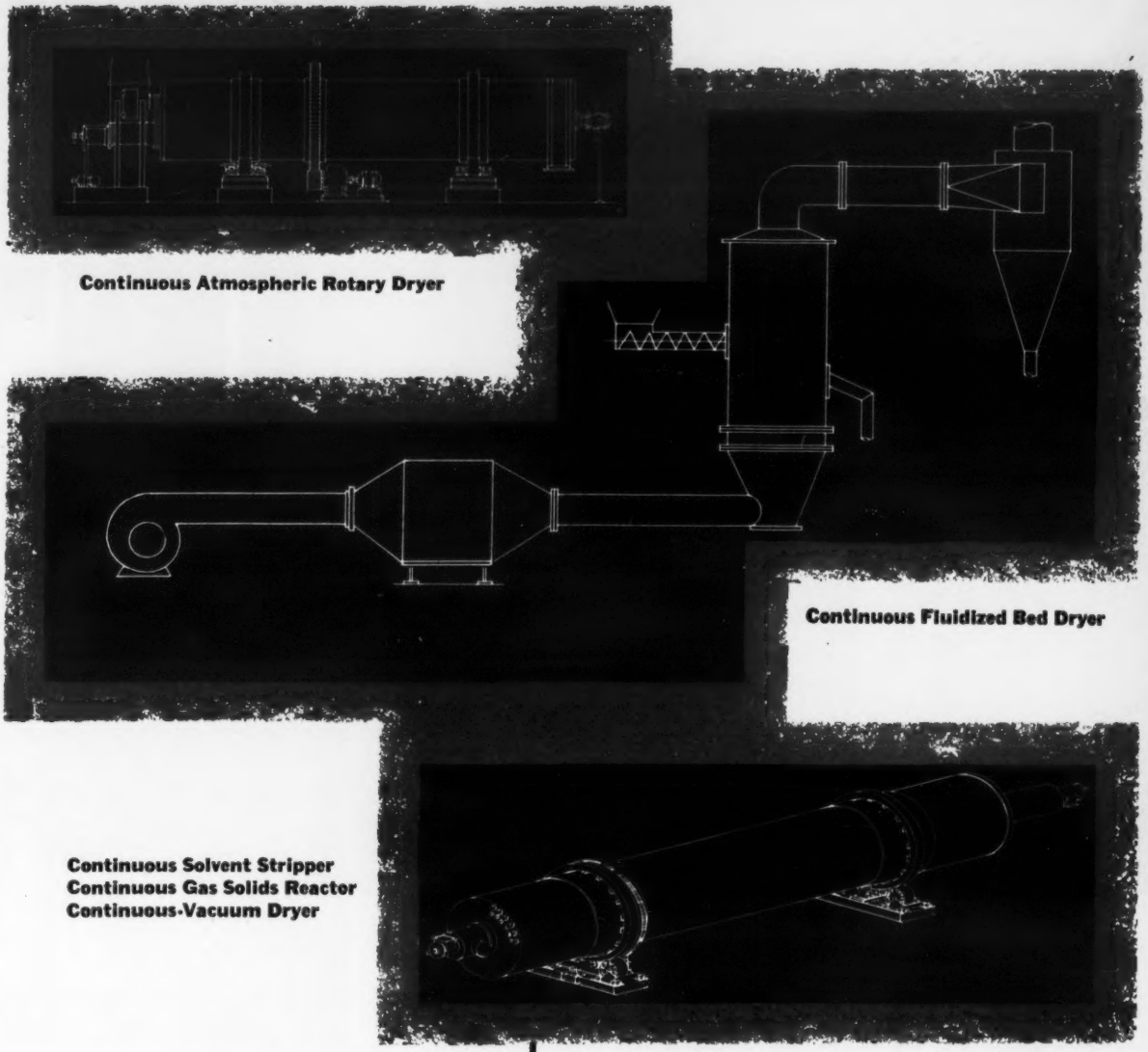
Description: Pneumatic mixer-pump was originally developed to charge pulverized ballast into heavy equipment tires. Tests showed that machine had wide variety of other applications.

Unit operates on a semi-continuous cycle with non-pulsating pressure and delivery.

Machines are made in two sizes. Small unit has material capacity of two cubic feet and costs $139.50. Large model holds eight cubic feet and sells for $269.50.

(Industrial mixer and pump is product of Led Ballast, Inc., 1331½ Arapahoe Street, Boulder, Colorado.)

Check 5225 opposite last page.



Now, at one convenient location, you can test-dry your materials in a variety of equipment

At General American's East Chicago pilot plant, you can test the drying or reacting of your materials in the widest range of drying equipment ever assembled in one place.

Louisville Dryer engineers will work with you—study your materials and needs, make recommendations for type of equipment, size and heating medium. You can check these recommendations for yourself through practical tests. Your Louisville Dryer is then engineered for most efficient and economical service—built specifically to meet your needs.

To test the drying of your materials in all these different types of drying equipment, call in a Louisville Dryer engineer. There is no cost or obligation.

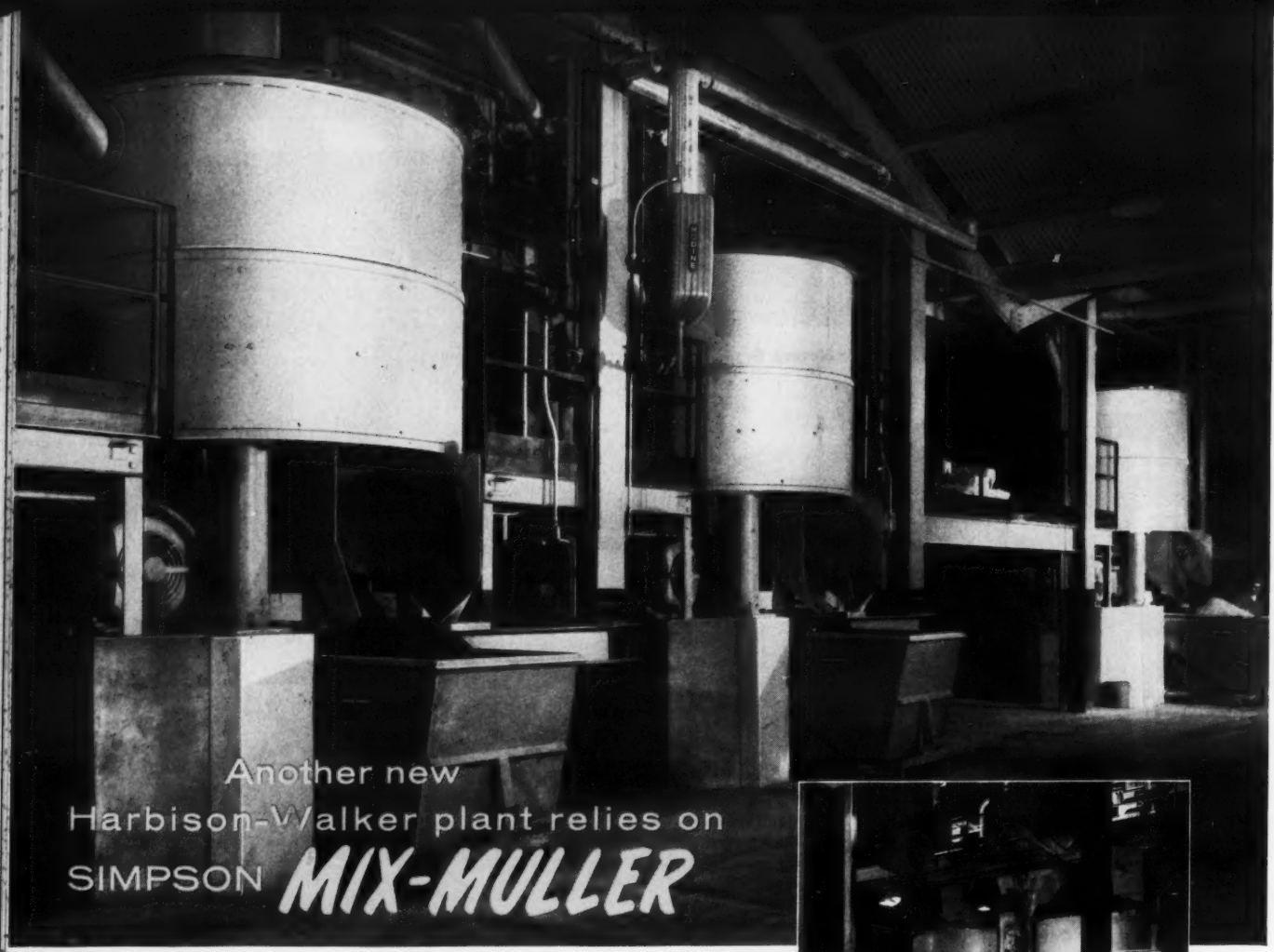
PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Office: 139 S. Fourth Street, Louisville 2, Kentucky • Eastern Sales Office: 380 Madison Avenue, New York 17, New York • In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 South La Salle Street, Chicago 90, Illinois.

Check 5226 opposite last page



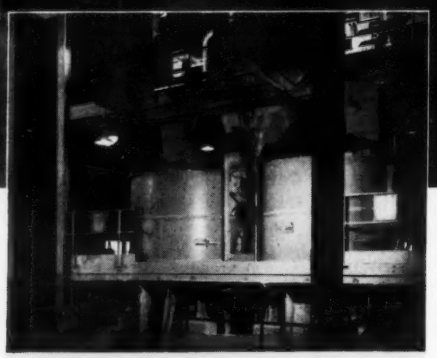
Another new
Harbison-Walker plant relies on
SIMPSON MIX-MULLER

Accurate batch control and positive moisture dispersion vital at new Hammond "basic" plant

Control is the keynote at Harbison-Walker's new basic refractories plant recently completed at Hammond, Indiana. *Seven stories* of the most up-to-date screening, batching and proportioning equipment help deliver precisely controlled, accurately proportioned materials to the mixing floor. Here, three 2½F Simpson Mix-Mullers provide intensive *controlled dispersion* of moisture, binders and basic materials, to predetermined properties—for delivery to a battery of power presses.

At Hammond, as at many modern Harbison-Walker plants—and in the refractory operations of leading producers *all over* the country, Mix-Mullers are relied upon for the positive moisture control, intensive blending and controlled dispersion that is so necessary to the scientific production of dense, precision sized, precision *performing* refractory products.

Wherever quality and control *really* count—in the preparation of *any* dry or wetted solid . . . you'll find Simpson Mix-Muller in the key slot.



Above: Two of six No. 3 Mix-Mullers used to prepare all silica refractory material at Harbison-Walker's *Windham, Ohio* plant. In all, Harbison-Walker uses more than twenty Simpson Mix-Mullers.

Below: View from mixer platform showing 2½F Mix-Mullers at Harbison-Walker's Hammond, Indiana plant. Weigh larry in background is charged from overhead bins. Is used to receive components for precisely proportioned 4000-lb. batch

WRITE FOR BULLETIN showing how Mix-Muller is used throughout the Chemical & Process Industries.

SIMPSON MIX-MULLER DIVISION
National Engineering Company
640 Machinery Hall • Chicago 6, Illinois

P-258

THAT'S INTERESTING

Like love and marriage

Boats and paint go together. It will be no surprise to owners of boats that they can use up a lot of paint. Landlubbers may be surprised to know that about 9.8 million gal of the cover up stuff was used for the pleasure craft of the US in 1957. Sales in marine paints and coatings hit $45 million in record 1957. (*Oil, Paint & Drug Reporter*)

Fungi proof

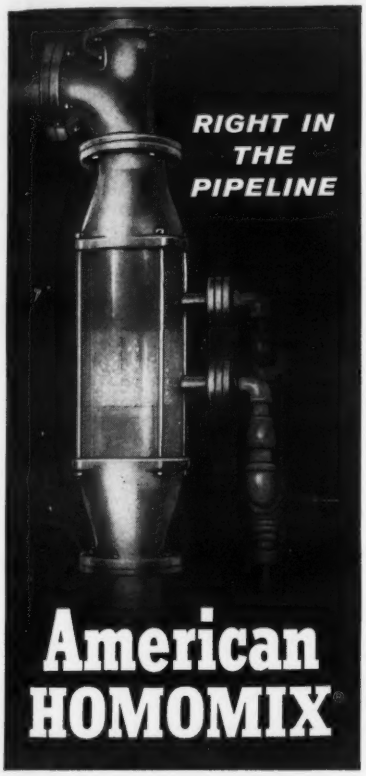
Plastic-coated wood will not decay under any moisture condition says the Society of the Plastics Industry in a recent report. Plastic sterilizes wood surface, keeps out decay fungi; the kiln drying sterilizes wood interior.

New ones

Of gross sales in the ethical drug industry in 1957, 70% were for products not developed ten years ago.

For more information on product at left, specify 5227 see information request blank opposite last page.

CONTINUOUS
LIQUID, GAS OR SLURRY
CHEMICAL MIXING



American HOMOMIX®

Gives instant, uniform, complete mixing
without a mixing tank

Saves space, time and equipment. Simplifies and speeds the blending of one or more chemicals. Permits a wide range in the percentage of additives to base fluid and assures accurate, economical mixing control. Any number of diffusing stages can be selected. Provides for visual inspection of the mixing operation and access to diffusing impeller. Can be equipped with lift stage. Can be made of standard or special material and protectively coated. Easily installed in vertical, horizontal or inclined position. Wide range of sizes and capacities from 1 GPM to 15,000 GPM.

Send for Technical Supplement HM or for details on your application.

(Patented)

IN OUR **90TH** YEAR

AMERICAN WELL WORKS
Mixing, Pumping, Water & Waste Treatment Equipment
150 N. BROADWAY, AURORA, ILLINOIS
Sales Offices: Chicago, New York, and other principal cities

Check 5228 opposite last page

Corrosives dried easily in aluminized-steel tray ovens

Heat source may be either gas, steam, electricity

Uses: Drying various corrosive materials.

Features: Unit is constructed of heavy-duty, 22-gage aluminized steel. The material increases durability and ease of maintenance.

Description: Ovens are available in nine different models. Included are cabinets in two-compartment design as well as drawer and truck-type units.

Heat is controlled and distributed by adjustable dampers. Temperature range of electric models is 100 to 500°F.

Oven's aluminized steel construction makes it sturdy, easy to clean

Steam heated units operate at 100 to 200°F. Gas may also be used as heat source. Explosion-proof models are available for incendiary materials.

(Further information on corrosion-resistant drying ovens may be obtained from Despatch Oven Company, Minneapolis 14, Minn.)

Check 5229 opposite last page.

Process equipment

Various mixing, blending, drying, and other process equipment are illustrated in four-page Bul PE-5802 — Process Equipment Div., The H. W. North Co., PO Box 9051A, Birmingham 9, Ala.

Check 5230 opposite last page.

LEE *Corrosion-Resistant* PRODUCTS
For Reduced Processing Costs

KETTLES
TANKS
PANS

Write for bulletins on any of the products illustrated.

LEE METAL PRODUCTS COMPANY, INC.
ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE.

418 PINE STREET, PHILIPSBURG, PA.

Check 5231 opposite last page

LOOK WHAT HAPPENS

—when you

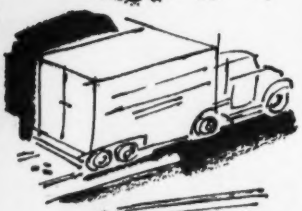
Call Cambridge

for

INDUSTRIAL WIRE CLOTH AND SCREEN

Bulk or Fabricated Parts

INQUIRIES ARE ANSWERED PROMPTLY—Whenever you call or write for information on prices, availabilities or service, you get a prompt reply.



DELIVERIES ARE MADE ON TIME—Orders for the most frequently used types of wire cloth are promptly filled. If we can't supply what you want from our complete stock, we'll schedule our looms to get it to you as soon as possible.

INSTALLATIONS ARE CHECKED—At Cambridge, orders aren't filled and forgotten. Our own sales engineers follow up your order to make sure our product is giving you the best possible service.

QUALITY, OF COURSE—Individual loom operation and countless checks on mesh size and mesh count assure you of highest quality wire cloth when you specify Cambridge.

Let us quote on your bulk or fabricated wire cloth needs. Samples for inspection or test purposes are available upon request. Call your Cambridge FIELD ENGINEER. He's listed in the phone book under "Wire Cloth." Or, write direct for FREE 94-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

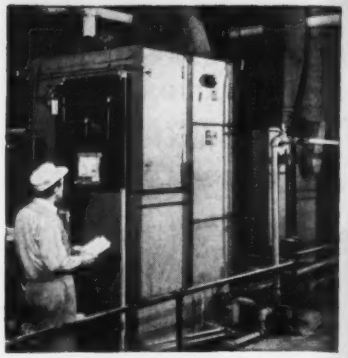
Department F, Cambridge 5, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 5232 opposite last page

DRY and CLEAN AIR at the RIGHT TEMPERATURE

- to control your product quality
- to protect a critical operation
- to protect apparatus from moisture damage
- to DRY your material or product
- to control packing or storage conditions
- to assure precision in testing or research
- to increase air conditioning capacity



Air Condition by the NIAGARA Method Using HYGROL Liquid Absorbent

This compact method, giving high capacity in small space, removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the air.

Most effective because... it removes moisture as a separate function from cooling or heating and so gives a precise result, and always. Niagara machines using liquid contact means of drying air have given over 20 years of service. The apparatus is simple, parts are accessible, controls are trustworthy.

Most reliable because...the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions... no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

Most flexible because...you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

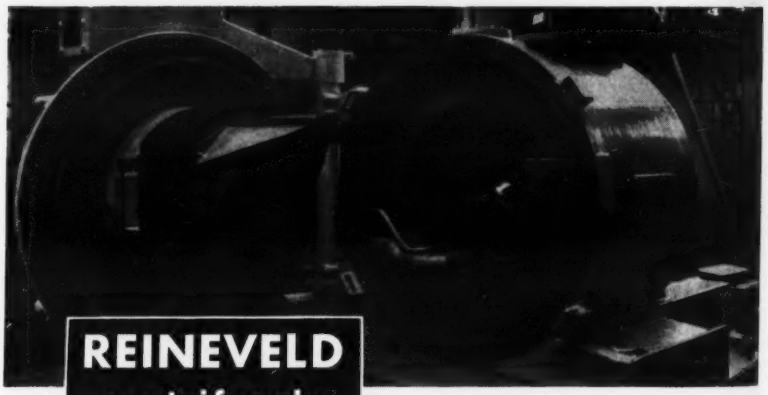
Write for Bulletins 112 and 131 and complete information on your air conditioning problem.

NIAGARA BLOWER COMPANY

Dept. CP-5, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 5233 opposite last page



REINEVELD centrifugals

Reineveld 51" Automatic Centrifuge showing easy access to internal parts.

are used extensively for dewatering and washing of crystalline solids, and for separation and clarification of fine amorphous slurries. Effective bowl capacities range from 3 to 325 gallons. Reineveld is one of the world's largest builders of centrifugal equipment—avail yourself of the services and experience of a leader.

Consult our listing in CEC or write for bulletin 356.

Sold and Serviced by:

Heyl & Patterson INC.

55 FORT PITT BLVD. · PITTSBURGH 22, PA.

Check 5234 opposite last page

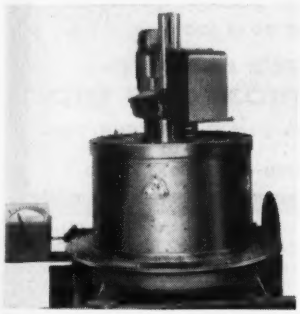
Faster settling rates in thickeners

Uses: Separating slurries, flocs, slimes, similar mixtures.

Features: Thickeners are equipped with automatic rake-raising and -lowering mechanism that holds rakes at optimum height for fastest settling rate.

Description: Automatic rake positioning mechanism permits operator to use different flocculating agents for faster and more efficient settling.

When overload due to buildup of solids occurs, rakes automatically raise a small distance where they remain



Automatic mechanism raises or lowers rakes on thickener to give fastest settling rate

for predetermined period of time. If overload persists, process is repeated until rakes are finally raised to point above overload area.

When overload is relieved, rakes automatically lower themselves in fixed increments to normal position. Thickeners are available in 16 to 20 ft diameter sizes.

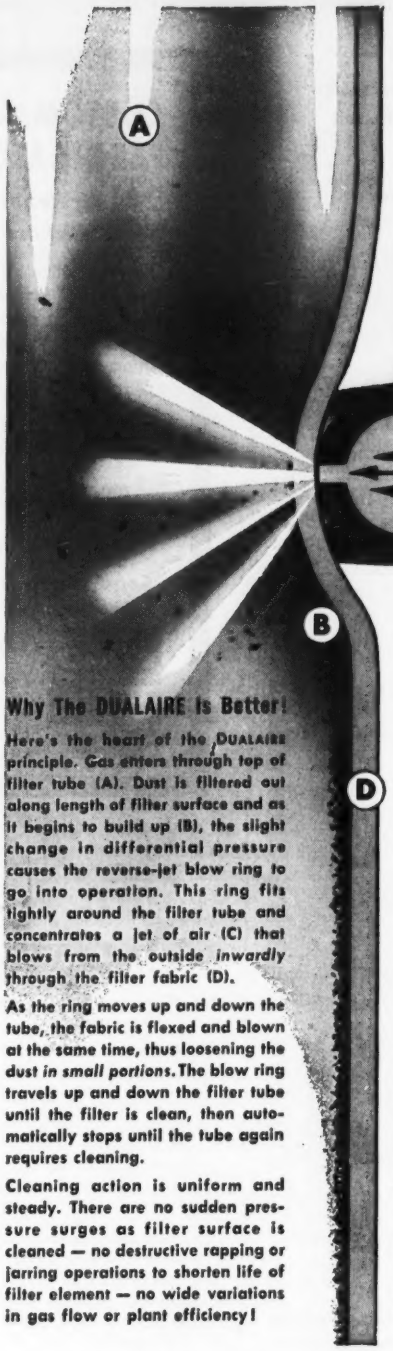
(Automatic thickeners are product of Denver Equipment Company, PO Box 5268, Denver 17, Colorado.)

Check 5235 opposite last page.

Liquid-solids separators

Bulletin of 16 pages describes and illustrates manufacturer's liquid-solids separation equipment. Many installations are shown and specifications included. Bul 830—Equipment Engineers, Inc., 41 Sutter St., San Francisco 4, Calif.

Check 5236 opposite last page.



Why The DUALAIRE Is Better!

Here's the heart of the DUALAIRE principle. Gas enters through top of filter tube (A). Dust is filtered out along length of filter surface and as it begins to build up (B), the slight change in differential pressure causes the reverse-jet blow ring to go into operation. This ring fits tightly around the filter tube and concentrates a jet of air (C) that blows from the outside *inwardly* through the filter fabric (D).

As the ring moves up and down the tube, the fabric is flexed and blown at the same time, thus loosening the dust *in small portions*. The blow ring travels up and down the filter tube until the filter is clean, then automatically stops until the tube again requires cleaning.

Cleaning action is uniform and steady. There are no sudden pressure surges as filter surface is cleaned — no destructive rapping or jarring operations to shorten life of filter element — no wide variations in gas flow or plant efficiency!

There are many other advantages built into the DUALAIRE. *For further details send for descriptive 8 page booklet. Or contact your nearest Western Precipitation representative!*

If you use filter systems...

CHECK THESE MULTIPLE ADVANTAGES OF THE REVOLUTIONARY *JET-CLEANED* Dualaire* DUST COLLECTOR!

No pressure surges!
No filter choking!
Efficiencies up to 99.99%!

If you use bag-houses or other similar collecting systems in your plant operations, be sure to investigate the *many* vital advantages built into Western Precipitation's new DUALAIRE Dust Collectors. Backed by the same well-known organization that pioneered commercial application of COTTRELL Electrical Precipitators and MULTICLONE Mechanical Collectors, DUALAIRES bring entirely new performance and efficiency standards to filter-type collection systems.

As outlined at the left, heart of the DUALAIRE is a jet-cleaning blow ring that travels up and down the cloth filter tube, keeping it clean without the alternate choking and pressure surges characteristic of conventional rapping, vibrating, or jarring systems of cleaning off the collected dust. *Result*—

▶ **UNIFORMLY LOW PRESSURE DROP** is assured, because the collected dust is removed steadily and in small increments — not by sudden surges!

▶ **UNIFORMLY HIGH EFFICIENCIES** — as high as 99.99% under actual field conditions — are maintained by the constantly-cleaned filter surfaces. There is no "choking" action — no variation in filter capacity as dust accumulates!

▶ **LONGER FILTER LIFE** is obtained because the filter fabric is not subjected to destructive jarring, rapping and vibration of conventional filter cleaning methods. The Dualaire cleaning action is gentle — yet far more effective!

▶ **LESS EQUIPMENT IS REQUIRED** to handle a given capacity with the Dualaire because no standby sections need be provided for gas cleaning while other sections are shut off for rapping.

The Dualaire filter is kept constantly clean — automatically — while it is filtering out the suspensions. The gas is filtered and the dust removed simultaneously — without interruption. Saves space, simplifies installation!

▶ **MAXIMUM ADAPTABILITY** to varying installation requirements is assured by the "sectionalized" design of the Dualaire. Each section is available in 5 different heights — and as many sections can be bolted together as desired to meet plant requirements. As needs increase, simply add more sections!

▶ **EFFICIENT STRAIGHT-THRU DESIGN** of filter tubes assures easier dust recovery, better flow. Dirty gas enters top of tube, is filtered through the walls, and dust drops by gravity through bottom of tube into collection chamber. Separated material does not re-entrain in the gas flow

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
HOLO-FLITE Processors
HI-TURBIANT Heaters

WESTERN
PRECIPITATION
CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., Dominion Square Bldg., Montreal

Check 5237 opposite last page

NEW ALUMINIZED STEEL BODY!

Durability and ease of maintenance have been increased through the use of corrosion-resistant 22 gauge aluminized steel in the heavy-duty body construction of the Despatch Oven Company's new and complete line of tray dryers.

Completely adjustable dampers allow any combination of recirculation or fresh air direct draft at temperatures from 100° to 500° (steam to 200°).

Designed for experimental and industrial use, this versatile new series has been successfully applied to operations from dehydrating chemicals to curing plastics and drying or sterilizing glassware and medical instruments.

Read complete details in our bulletin—send for it today!

DESPATCH OVEN CO.

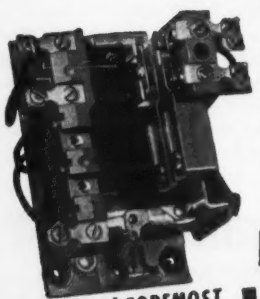
• Industrial Furnaces • Analytical Ovens
• High Temperature Fans • Core and Mold Ovens • Finishing Systems

DESPATCH OVEN CO., 343 Despatch Building, Minneapolis, Minn.

Check 5238 opposite last page

B W *All Electric Floatless...*

LIQUID LEVEL CONTROLS



Control variations in levels from ¼" upward. Remote control if desired — any distance. Controls unaffected by acids, caustics, pressures or temperatures.

Since 1933 B/W Controls have provided positive, dependable, economical liquid level control. No floats! No moving parts in liquid. 6

WRITE FOR CATALOG

B/W CONTROLLER CORPORATION

2204 E. Maple Road
Birmingham, Mich.

FIRST and FOREMOST IN THE FLOATLESS CONTROL FIELD

Check 5239 opposite last page

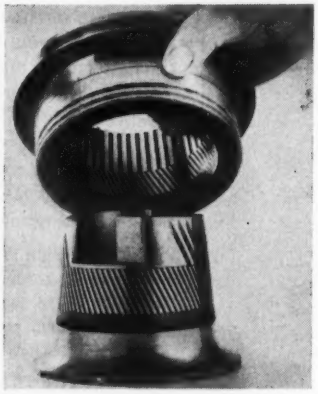
Efficient dispersion mill can be operated batch or continuously

May be disassembled and cleaned in minutes

Uses: Wet milling and grinding, homogenizing, dispersing, and emulsifying various products in chemical and allied industries.

Features: Mill can be operated continuously or batchwise. Unit achieves faster, more complete homogenizations and dispersions at minimum cost. Milling and dispersion effects are produced by both high-frequency hydraulic and mechanical shear. All interior parts are easily accessible and can be cleaned or exchanged in matter of minutes.

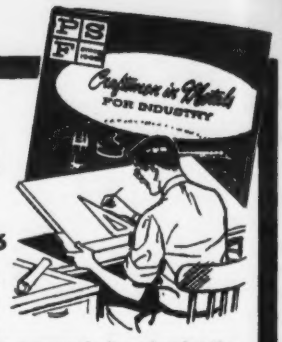
Description: Unit consists essentially of a conical ring-shaped stator, having from two to five grinding stages, depending upon model. Rotor, having same number of grinding stages, turns at high speed within stator. Rotor and stator are arranged to form milling gap, which can be adjusted as needed.



Rotor and stator of 3-stage mill. First stage, having largest and coarsest grooves, is located towards top of parts

Rotor and stator faces are grooved. Grooves located at the periphery of the opposing milling stages become successively finer from stage to stage.

Grooves are arranged perpendicular in direction to base plate of mill housing, or



CUSTOM FABRICATING DATA—*Request New Brochure M-56*

This information on plant facilities and services will be of value to purchasing, procurement and engineering personnel when planning the custom fabrication of...

PRESSURE VESSELS

for the Chemical Processing Industry on the West Coast

Send blueprints for prompt quotation on your next job

PS F SINCE

PUGET SOUND FABRICATORS, INC.

3670 E. Marginal Way Seattle 4, Wash.

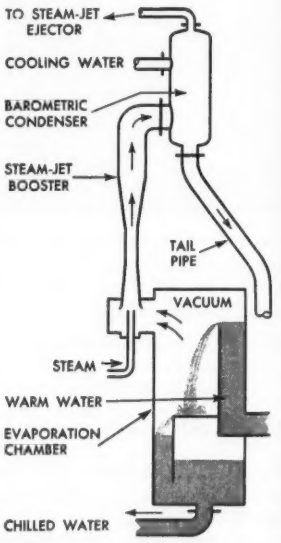
Craftsmen in steel plate and alloys up to 1"

Check 5240 opposite last page

How to **CHILL WATER** with **STEAM**

I-R Steam-Jet Coolers chill large volumes of water down to temperatures as low as 35 F, with no power but *steam* — and no refrigerant except *water*. The simplicity, economy, dependability and safety of water-vapor refrigeration makes it the ideal solution to process cooling problems wherever steam is available.

The cooling action is achieved by *evaporating* a small portion of the water to be chilled, in a vacuum chamber which is evacuated by a steam-jet ejector. The ejector can discharge into either a barometric or surface condenser. Overload capacity is higher than with any other system. And no special foundations nor vibration-isolating devices are required.

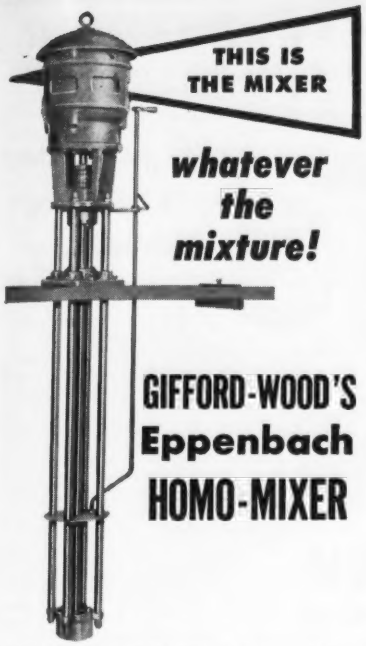


Send for Bulletin No. 9143-B

Ingersoll-Rand

4-774 11 Broadway, New York 4, N. Y.

Check 5241 opposite last page



whatever the mixture!

GIFFORD-WOOD'S Eppenbach HOMO-MIXER

A high speed, high shear homogenizer-mixer for complete, "no-vortex" mixing of chemicals, cosmetics, pharmaceuticals, protective coatings, dyestuffs and inks to produce emulsions of small particle size and long shelf life.

Check these features:

- Continuously draws material from the bottom of the tank, thus eliminating a vortex and minimizing air intake.
- Easily adjustable deflector plate to control flow pattern.
- Stationary or portable operation.
- Homogenizing head dismantles easily for cleaning.
- All immersed parts of stainless steel.
- Can be modified to suit existing processing requirements.
- Capacity governed by viscosity, specific gravity and batch size.
- Laboratory and production sizes.

Free

Write for our 24-page Fact Book 600, describing Homo-Mixers and complete Eppenbach line.

GIFFORD-WOOD CO.
Since 1814

GIFFORD-WOOD CO.
Eppenbach Division, Dept. CP-5
Hudson, New York

Send me Eppenbach Catalog 600.

Name_____
Title_____
Company_____
Address_____
City_____ State_____ 3636

Check 5242 opposite last page

run in angular direction (see photo).

High-frequency hydraulic shear effects coupled with violent turbulence and inter-particle impact action are produced within each stage. The impact action results from high-speed eddy currents created between the grooved milling surfaces.

Mills come in various sizes ranging in throughput from 44 to 30,000 lb/hr. Standard models are powered by 2 to 100 hp, 3600 rpm motors. Units do not require water cooling.

(PUC multistage dispersion mills are product of The Pfaudler Co., a division of Pfaudler Permutit Inc., 1000 West Avenue, Rochester 3, New York.)

Check 5243 opposite last page.

Dehydrating equipment

Illustrated bulletin of 12 pages describes and presents specifications on manufacturer's equipment for dewatering, drying, and cooling. Bul 3057 — Davenport Machine & Foundry Company, 1628-66 West Fourth St., Davenport, Iowa.

Check 5244 opposite last page.

"We won the National Award again. Not a single lost-time injury for a full year!"

Thanks to Ken Boyea, Hercules Powder Co., Holyoke, Mass.

NO SHAPE TOO SCREWY
for ACE Rubber Linings and Coverings

Most any size or shape of special processing equipment can be lined or covered with quality Ace hard or soft rubber . . . for meticulous protection against corrosion, to resist abrasive wear, or to provide electrical insulation. Ask for recommendations.

STOP VALVE CORROSION at lower cost

There's an Ace hard rubber, rubber-lined, or plastic-lined valve for every corrosion application. Sizes from 2" to 24". Diaphragm, gate and check types. Free *Bulletin CE-52* lists chemicals that can be handled.

Take the guesswork out of CORROSION

No need for "trial and error" to find the right rubber or plastic chemical equipment. Consult American Hard Rubber Company first. Now eleven basic materials. Wide range of temperatures, pressures, strength. Backed by a century of experience. Write for facts today, or ask for name of Distributor.

FOR HIGH PRESSURES OR BIG PIPE LINES

Ace Rubber-Lined Steel . . . strength and pressures of steel plus chemical resistance of hard rubber. Excellent for alkalis, most inorganic acids, many organic acids, all salts, bleaches. Sizes 1¼" to 24" and up. *Bulletin CE-52.*

ACE-HIDE ACID PAIL

Practically indestructible

Its made of a new rubber-plastic material that's tough, resilient, suitable for handling most acids and alkalis. 3-gal. size. Easy-pour, drip-proof spout. Also 1-qt. and 2-qt. dippers, hard rubber bottles, etc. Write for name of nearest dealer.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

Check 5245 opposite last page

For Safe, Leakproof Shut-off of Liquid Fuels

SPECIFY:

Hamer Vented Chest GATE VALVES

Chevron Packing
Expands as pressure increases to prevent escapage at stem.

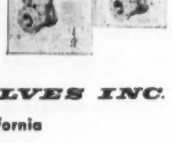
Chest Vented to Pipe Line
Seal on one side vents chest to pipeline, thus preventing locked-in pressure buildups.

Micro-finish Wedge
Seating surfaces are precision finished for exacting metal to metal fit against seats.

Positive Shutoff Seal
Located in one side of the wedge only, this seal compresses against valve seat forming an absolute shut-off.

Integral Body Seat
Integral design eliminates threads, welds & other objectionable surface irregularities.

• Proven under environmental field conditions, these contour engineered Gate Valves seal equally well with line flow in either direction. Seal in one side of wedge vents valve chest to pipeline preventing dangerous pressure buildup. Valves are available in various sizes in a range of metals. Write today for literature and the name of your nearest Hamer representative.



Send for FREE Bulletins LTG, VCG ▶

Hamer VALVES INC.

58-1B Box 1851 — Long Beach 1, California

Check 5246 opposite last page

Dry products mixed 'right-in-the-pipe' by continuous unit

Can be jacketed, equipped for vacuum operation

Uses: Continuously mixing viscous or high-density materials.

Features: Mixer is designed to be installed in process pipeline. It can be jacketed for heating or cooling and can also be equipped for vacuum operation.

Mixer handles dry materials, is designed for mounting in process pipeline

Description: Double-arm unit provides heavy-duty, high-speed mixing. Seven feet long, the machine has 7-inch mixing chambers. When handling dry or powdered products that are difficult to disperse, mixer has capacity of from ½ to 4 cfm.

(Continuous mixer is product of Read Standard Div., Capitol Products Corp., York, Pa.)

Check 5247 opposite last page.

Efficient, low-cost cooling provided by versatile, compact condenser

Handles either liquids or gases, cuts water losses

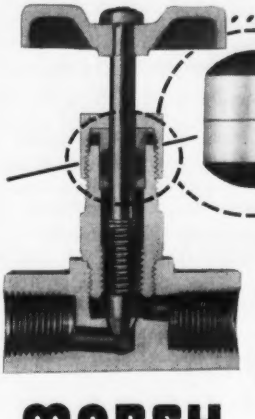
Uses: Condensing, cooling liquids and gases.

Features: Condenser operates on principle of evaporative cooling, with heat of condensation being rejected outdoors. Spray water is recirculated, resulting in only minimum use of water. Initial cost of machine is relatively low.

Description: Vapors are condensed in two parallel-mounted, water sprayed coils enclosing a central plenum under fan section. Air stream

"...yet we have **IMPROVED** *it"*

The Marsh Stainless Steel Needle Valve could have gone right on being the finest in its field...yet we have improved it



...with fabulous **"TEFLON"** *packing*

Note the "close-up." The Marsh Marpak packing system, originated in the Marsh Needle Valve, was one of the factors that has enabled it to stand up and work right under pressures up to 10,000 psi.

Now "Teflon" is used in this packing system—the miracle material of almost incredible *toughness, resilience* and *non-adhesive* properties...properties that are not impaired by the most powerful of solvents, acids, or alkalies even at temperatures *up to 500° F.*

Net result: The guaranteed application-range (up to 10,000 psi) is now effective at any temperature up to 500° F. (In other makes, permissible temperature decreases as pressure increases.)

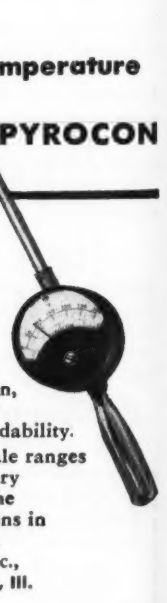
Marsh Marpak Teflon Packing System is standard in Marsh 416 Stainless Steel Needle Throttling Valves. Ask for facts.

MARSH
Needle Valve in 416
stainless steel throughout
Now with "Teflon" Packing

MARSH INSTRUMENT CO. *Sales Affiliate of Jas. P. Marsh Corp.,* **Dept. Z, Skokie, Ill.**
Marsh Instrument and Valve Co. (Canada) Ltd., 8407 103rd St., Edmonton, Alberta
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas

Check 5248 opposite last page

READ any surface temperature with *Alnor*® **PYROCON**



Equipment...material...metallic or non-metallic...flat, curved... revolving or stationary—you can read every surface temperature accurately in less than 3 seconds!

Compact, complete in precision design, this rugged instrument assures highest standards of speed, accuracy and dependability.

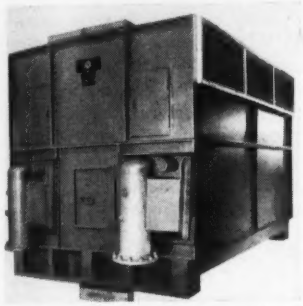
Alnor Portable Pyrocons come in scale ranges to 2000° F., with thermocouples for every application. You'll find full details on the Pyrocon exactly suited to your operations in Bulletin 4257. Send for your copy now. Write: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Alnor **PRECISION INSTRUMENTS FOR EVERY INDUSTRY**

Check 5249 opposite last page

enters above coils, traveling down over coils and entering plenum, where it drops its entrained moisture and passes up and out of unit by means of fan.

Condensate drains into manifold at bottom of unit



When mounted on top of stripping tower or vacuum kettle, unit forms complete, self-contained condensing system

where a screening baffle tube separates out non-condensibles. These are sub-cooled seven or eight degrees and ejected by a steam ejector or vacuum pump. Any vapor remaining with non-condensibles is condensed and returned through reflux tubes.

Condenser is capable of maintaining a high vacuum economically. Condensing temperature may hold within 20°F of ambient wet-bulb. When installed on top of a stripping tower or above a vacuum kettle, unit forms complete, compact, self-contained condensing system.

(Aero vapor condenser is development of Niagara Blower Company, 405 Lexington Ave., New York 17, N.Y.)

Check 5250 opposite last page.

Air-operated agitators

Features of manufacturer's new line of pneumatic agitators are presented in 16-page catalog which illustrates, describes, and presents dimensions on all equipment. Information on how to select the right model agitator is also presented. Cat 30 — Eclipse Air Brush Company, Newark 7, New Jersey.

Check 5251 opposite last page.

NATIONAL *Leaders in Your Industry Have Selected "NATIONAL" as the Leader in the Field of* ® **PERFORATED APRON-TYPE CONVEYOR DRYERS**

Famous names among the manufacturers and processors of chemicals, fibers and allied products are proudly listed in the growing roster of "NATIONAL" customers.

These companies, by their selection of "NATIONAL" Perforated Apron-Type Conveyor Dryers, have demonstrated their belief in the outstanding leadership which "NATIONAL" has earned in the design and construction of this and related types of drying and conditioning equipment.

AMERICAN VISCOSE CORPORATION
ARMOUR & COMPANY
THE PHILIP CAREY MANUFACTURING CO.
DAVISON CHEMICAL COMPANY
DIV. OF W. R. GRACE & CO.
DU PONT COMPANY OF CANADA (1956) LTD.
E. I. du PONT de NEMOURS & CO.
THE GENERAL TIRE & RUBBER CO.
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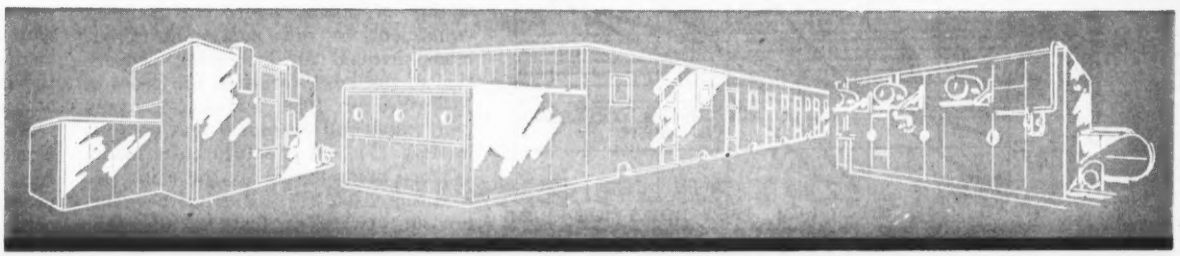
CHEMSTRAND CORP.

Send for Literature or Representative, without Obligation

THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass. • *Southern Agent:* F. W. WARRINGTON, Charlotte, N. C.
Cable Address: "NADRYMA"—W. U. Code



Check 5252 opposite last page

As chemical plants become more automatic, the job of keeping them running grows . . . and grows more complex. At Du Pont, this metamorphosis is typified as we view . . .

THE CHANGING FACE OF MAINTENANCE

O. S. YORK, Manager, Maintenance Engineering Section
E. I. du Pont de Nemours & Co., Wilmington, Del.

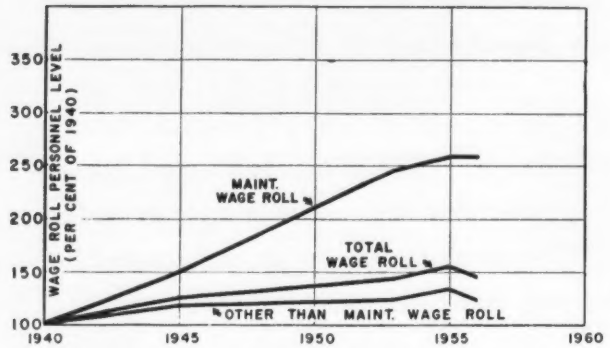


Fig 1—Percent increase in Du Pont wage roll personnel from 1940 through 1956. Maintenance wage roll increased over 250% during the period

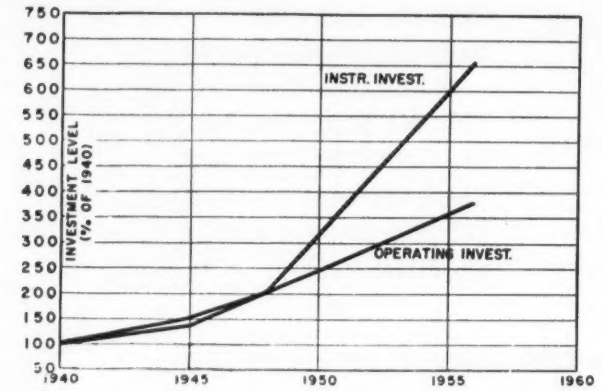


Fig 2—Instrument investment compared to operating investment, 1940 to 1956 — up 500%

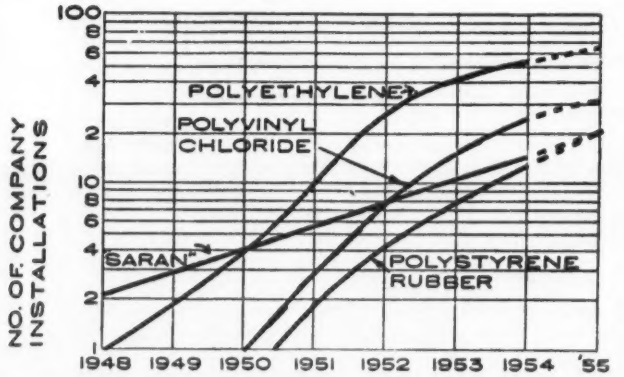


Fig 3—Trends in plastic piping systems at Du Pont. Polyethylene installations grew from one in '48 to over 60 in '55

Over the past fifteen years, the chemical engineer, along with other technical personnel, has contributed to great technological advancements which have provided new and improved products. However, this has increased the complexity of modern chemical processes and equipment, and has placed an ever-increasing responsibility on maintenance forces.

As a result, every maintenance head has watched maintenance cost increase steadily, and many company executives have viewed maintenance cost increases with alarm. Everyone has been on the lookout for new and better techniques which can be used either to reduce or control these costs. Therefore, many effective improvement programs have been initiated over the years. Yet the cost for maintaining this country's industrial facilities continues to increase about 10% per year.

I think the Du Pont Company is a representative example of chemical and petroleum industry. Today we feel that Du Pont's maintenance problem is changing in magnitude, in character, and in significance.

Maintenance increases in magnitude even more quickly than the company grows. Quality of product and continuity of operations of the complex equipment in our continuous processes demand an increasing proportion of the labor force. In the years of 1940 through 1956, increase in company wage roll personnel was approximately 150% of the 1940 base. Maintenance labor curve for the same period increased 250% and has been increasing twice as fast as all other wage rolls (Figure 1).

Advancing technology is changing the character of maintenance. In the same 16-year period, 1940 to 1956, instrument investment at Du Pont increased 500% (Figure 2). As examples: Investment in special control valves increased from $100,000 in 1944 to $7 million in 1956; graphic panel investment from $100,000 in '46 to $6 million in '56; installations of photometric analyzers from just 10 in 1949 to 170 in 1956.

New engineering materials are also changing the character of the maintenance problem. As shown in Figure 3, the seven-year period from 1948 to 1955 saw increased use of such plastic piping systems as Saran-lined steel, polyethylene, polyvinylchloride, and polystyrene rubber. Polyethylene installations alone went from one in '48 to in excess of 60 by '55. As these materials of construction become available, new skill requirements and techniques are required by a maintenance organization to take full advantage of their potentialities.

When our process was batch type, a component reliability of 90% usually meant that the process was 90% available. As more and more components are tied together to form the over-all process, reliability decreases even though the same 90% component reliability is maintained. This emphasizes necessity of improving component reliability above 99.8% if the continuous process is to be operated economically.

As maintenance performance exerts a greater influence on profits and return on investment, the maintenance problem changes in significance. With continued development of automatic controls we are approaching more and more the continuous plant with mini-

mum process hold-up time. Therefore, it is becoming more and more important to operate the plant with high-quality production and a minimum of outage.

As employment and maintenance patterns change, more responsibility will be placed on the maintenance head. If he is to accept and discharge this increasing responsibility, he must recognize four basic needs:

1. Need for improved selection, training, and upgrading of mechanics.
2. Need for improved tools and techniques.
3. Need for improved preventive and corrective maintenance programs.
4. Need for improved administration and control of maintenance work.

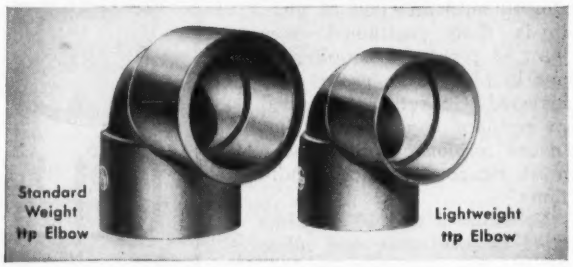
How well the maintenance head fulfills these needs if of prime importance to chemical engineering supervisors. It will contribute heavily to success or failure of continuity of operations in the complex chemical plant.

(From a paper presented at the Twelfth Annual Meeting, South Texas Section of the AIChE.)

Mr. York has been with Du Pont since 1941; first with Remington Arms Company, and then with the Belle and Sabine River Works of the Polychemicals Department before joining the Engineering Service Division in 1950. His early career, after obtaining a BS degree in Chemical Engineering from Texas A & M College, included refinery operations and industrial engineering work with Gulf Oil Corp.

PVC PIPING NEWS

PUBLISHED BY TUBE TURNS PLASTICS, INC. • LOUISVILLE 1, KENTUCKY

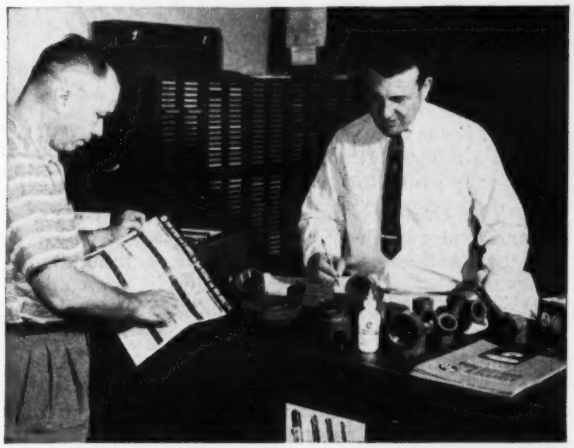


Looking for lower costs?

UPVC piping is the key to important savings... in first cost and in maintenance. Now, Tube Turns Plastics gives you another cost-cutting plus... the economy of **ttp** lightweight fittings for low pressure service. Same top-quality, unplasticized material as heavier **ttp** fittings, and injection molded by exclusive Hendry process. For use with Schedules A and 40 UPVC pipe. Easily joined to pipe with **ttp** Solvent Cement. Write for Bulletin TTP-119R.

No substitutes here

Cautious buyers such as this leading business machines manufacturer *specify* **ttp** for UPVC piping to guard against costly failures. These fittings are made by the exclusive Hendry process, with *unplasticized* polyvinyl chloride (UPVC). No cheap substitute material here!



Available nearby

Your **ttp** distributor carries a full line of UPVC fittings, flanges, valves, solvent cement and thread lubricant. He also provides help on installation data. Above: At Utility and Industrial Supply Co., Jackson, Michigan.

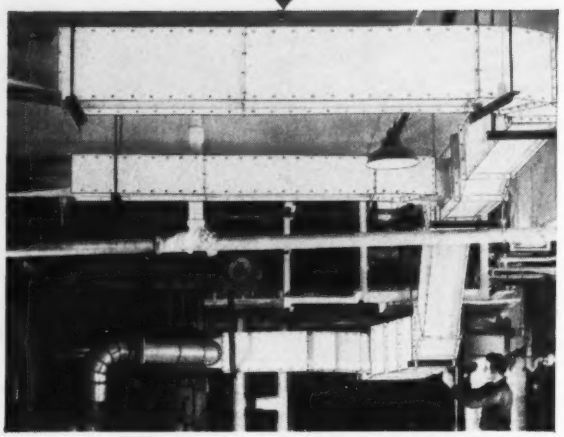
Leading Manufacturer of Unplasticized Polyvinyl Chloride Pipe Fittings, Flanges and Valves

TUBE TURNS PLASTICS, INC.

Dept. CP-5, 2929 Magazine Street • Louisville 11, Kentucky

Check 5253 opposite last page

Save Money!
ON CORROSION-RESISTANT Duct Work



ERVA-DUCT installation conveying corrosive fumes in this processing plant saved an estimated $2,000 as compared with system in previous service.

NEW Erva Duct

of Porcelain Enameled steel . . . . saves up to half the cost of stainless, PVC and similar protective materials for conveying or exhausting corrosive gases.

This chip-resistant, ceramic-coated duct is fire and explosion proof, unaffected by high temperature, and as easily cleaned or decontaminated as plate glass. Modular design simplifies installation, periodic inspection and re-piping for system changes.

ERVA-DUCT withstands abrasion and most corrosive atmospheres except hydrofluoric acid. Standard components permit assembly of duct systems ranging in cross section from 36 to 576 square inches with any special sizes available as required.

For complete details send prints and application data or request test panels for your own evaluation.

ERVALE CORPORATION

An ERVITE Affiliate

4000 W. RIDGE ROAD
ERIE, PENNSYLVANIA

Check 5254 opposite last page

Time and money saved by method of joining lightweight tube

Uses: For quick-coupling thin-wall steel, stainless steel, and aluminum pipe and tube.

Features: Method permits greater speed and fewer man hours for installation of pipe. Important savings are realized through lower initial cost of lightweight tube.

Description: Method is used for thin-wall pipe and tube in sizes from 1¼ to 12", and may be used for working pressures up to 1000 psi, depending on wall thickness of tube and type of coupling used.

Quick-coupling method for thin-wall steel, stainless steel, and aluminum pipe and tube cuts installation time and material cost

Coupling is quick and easy. When ends of tube are brought into position, gasket, which comes with coupling, is slipped onto one end of pipe. It is then positioned over joint of pipe and coupling is put in place over gasket and fastened. Gaskets are molded in resilient compositions that insure prolonged life under most rigorous service conditions.

Schedule 5 and 10 stainless steel elbows, tees, and other fittings are available for corrosive and other services.

("Vic-Easy" method was developed by Victaulic Company of America, Elizabeth, N. J.)

Check 5255 opposite last page.

For hazardous places

Explosion-proof enclosures are subject of two-color, six-page bulletin. Installation, forms, and sizes are listed. Spin Top bul — Square D Company, 4041 N. Richards St., Milwaukee 12, Wis.

Check 5256 opposite last page.

THIS FLOOR IS *Corrosion-proof*

SAUEREISEN No. 40

was used in laying this floor at a major brewing plant. Bottling alkalis and food acids resulting from processing have no effect on such a floor, because it is water-proof, and easily kept clean. Sauereisen No. 40 is a quick-setting, self-hardening resin base cement providing a mortar that can be troweled, so that floors are lastingly corrosion-resistant.

Tell us your floor problems! Write for catalog.

40 A

Sauereisen Cements Co., Pittsburgh 15, Pa.

Check 5257 opposite last page

MAINTENANCE PROBLEMS END WHEN YOU USE

CHARCOTE*

NEW AND DIFFERENT PROTECTIVE NEOPRENE LIVE RUBBER-COATING

CHARCOTE is not a rubber base paint. You do not "paint" surfaces . . . you actually rubber-coat them with protection! CHARCOTE air-dries and air-cures to a tough, pliable, rustproofing and waterproofing film of neoprene rubber, and has its built-in primer. CHARCOTE can be brushed on, rolled on, sprayed or used as a dip. Available in standard industrial colors including aluminum, red, black, green and grey; and in quart, gallon, five-gallon and drum containers.

Tougher Than The Metal Itself

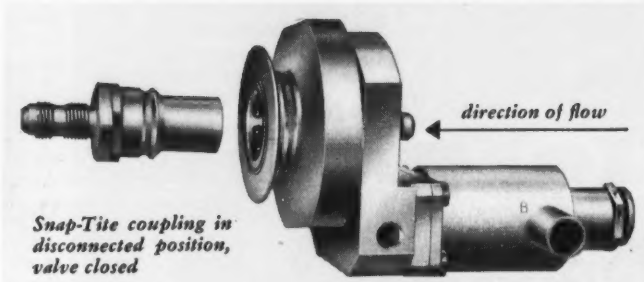
Protects Against:
CORROSIVE FUMES
SUNLIGHT AND HEAT
WEATHERING — ABRASION
MOISTURE — SALT SPRAY

Write For Descriptive Charcote Folder

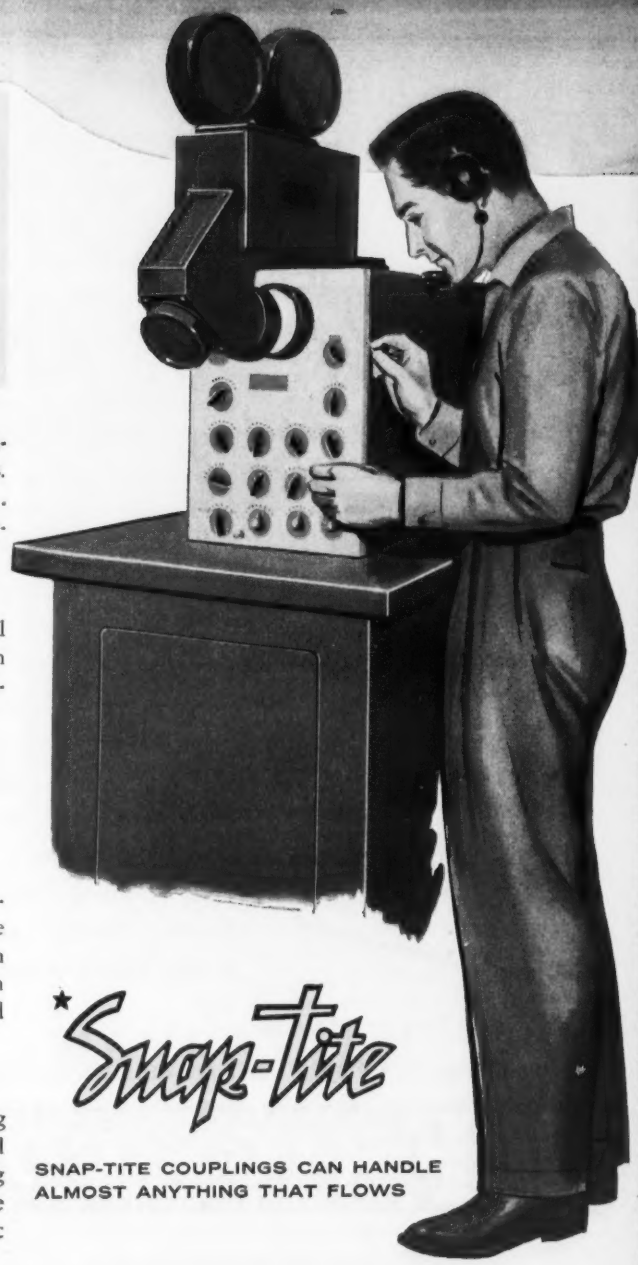
CHARLESTON RUBBER COMPANY
28 Stark Industrial Park, Charleston, South Carolina

Check 5258 opposite last page

SNAP-TITE REMOTE CONTROL COUPLINGS FOR GUIDED MISSILES



Snap-Tite coupling in disconnected position, valve closed



Here is a specially designed Snap-Tite quick-connect, quick-disconnect coupling, ideal for use in missile-fueling systems. This unit is specifically designed to be manual-connected . . . can also be disconnected manually, or by use of an air-actuated remote control.

NOT A DROP SPILLED!

When the coupling is disconnected, it spills only that small amount of fluid which clings to the metal. The valves in both the coupler and nipple automatically shut off when disconnected, *with no leakage.*

NO AIR INCLUSION!

Coupling operation encloses only a minute amount of air.

MINIMUM PRESSURE DROP!

Smooth, streamlined passages assure maximum flow.

Variations of this coupling, to meet your required specifications, can be furnished with the appropriate seals to handle liquified gasses, exotic fuels, and a large variety of fluids with working pressures up to 3,000 PSI and temperatures from −300°F to +400°F. Units have been designed up to and including 5″ size.

STANDARD COUPLINGS, TOO!

Your coupling needs might not be as critical as the coupling shown here, but you can be sure, when buying standard Snap-Tite couplings, that the same outstanding engineering and manufacturing skills are basic throughout the Snap-Tite line. Write for complete catalog . . . or describe your specific coupling problems. Snap-Tite, Inc., Union City 6, Pa.

★Snap-Tite

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

See your local Snap-Tite Sales Engineer.

Atlanta, Georgia
Eastman Atlantic Mfg. Co.
Baltimore, Maryland
A. L. Hacker Co., Inc.
Buffalo, New York
F. C. Bishop Co., Inc.
Chicago, Illinois
Norman Engineering Company
Cincinnati, Ohio
W. J. Purcell Company
Cleveland, Ohio
Pneu-Hydraulic, Inc.
Columbus, Ohio
Oyl-Air Equipment Co.
Corry, Pennsylvania
Al Xander Company
Dallas, Texas
Robert A. Shuey, Jr.
Dayton, Ohio
Scott Equipment & Engineering Co.
Denver, Colorado
Alta Engineering Co.
Detroit, Michigan
Cox Engineering Co., Inc.
Grand Rapids, Michigan
L. H. Flaherty Co.
Hackensack, New Jersey
Air & Hydraulic Equipment Co.
Honolulu, Hawaii
Arthur H. deRocher Co., Ltd.
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Filtrabon Corporation
Los Angeles, California
The Vickery Company
Ludlow, Kentucky
Riggs Engineering Company
Milwaukee, Wisconsin
Price Engineering Company
Minneapolis, Minnesota
Air Engineering & Supply Co.
Needham, Massachusetts
Stewart Miller Associates
New York, New York
Hummel Technical Products
New Westminster, British Columbia, Canada
Arvis Engineering, Ltd.
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Airline Equipment Company
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Pittsburgh, Pennsylvania
Ritter Engineering Company
Portland, Oregon
Jack Ogle & Co.
Salt Lake City, Utah
C. H. Spencer & Co.
Toronto, Ont., Canada
Tem Sales Company, Ltd.
Wichita, Kansas
Aviation Products Co.
Wichita, Kansas
Baker Engineering Company
Wilmington, Delaware
Eastman Atlantic Mfg. Co.
Wilmington, Delaware
Raylite Company

Check 5259 opposite last page

NEW-
JUST OFF THE PRESS

This new Bulletin, with 182 photographs, diagrams and tables, is a handbook of refrigeration in all its commercial and industrial phases—air conditioning, ice making, quick freezing, cold storage, process work, etc.

Details of heavy-duty compressors, multi-cylinder compressors, booster systems, condensers, coolers, coils, controls, valves and auxiliaries are fully explained.

THE "BIBLE" OF AIR CONDITIONING & REFRIGERATION PRACTICE

If your business uses cooling equipment, you'll profit from reading this informative 32-page booklet. Available in English, Spanish and Portuguese. Your free copy is waiting.

WRITE FOR YOUR FREE COPY OF BULLETIN 80 TODAY TO:

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA., U.S.A.

Check 5260 opposite last page

HYDRO-FILTER

Hydro-Filter Highlights of DUST CONTROL DOINGS

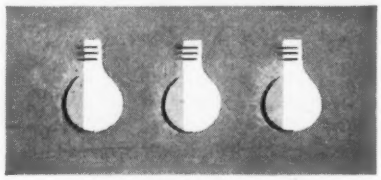
Dust Control problem of light bulb manufacturer is brought to light

The Problem:

A leading manufacturer of light bulbs wanted to build a new manufacturing line but was plagued by problems they had experienced with an existing wet scrubber. *No wonder* . . . powdered glass, broken bulbs, colored ceramic frit, alcohol and resins are used in the process and the line must operate 24 hours a day—7 days a week. A shutdown on the dust collector would mean a shutdown for the entire operation because of dust and noxious fumes. As a result, only two scrubber manufacturers would bid on the job.

The Solution:

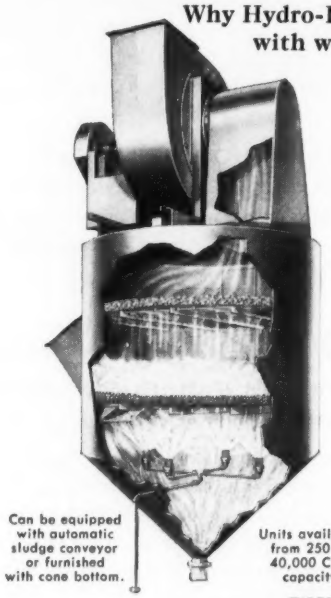
A type I Hydro-Filter with automatic sludge conveyor was selected for the job after customer evaluated evidence of its efficiency on the basis of (1) ability to operate at rated efficiency over prolonged periods at heavy dust load; (2) ability to operate over prolonged periods without shutdown for maintenance.



The Result:

Hydro-Filter did the job, and more. After 6 months operation the company ordered their *second* Hydro-Filter.

Why Hydro-Filter combines exceptional efficiency with welcome ease of maintenance:


Can be equipped with automatic sludge conveyor or furnished with cone bottom.
Units available from 250 to 40,000 CFM capacity

Air, water and glass spheres do the work in Hydro-Filter. There are no moving parts in the collection area. No baffles; nothing to load up and no "dead" areas to make cleaning a chore and efficiency a *myth.* The relatively simple design permits economical use of special materials of construction. It is designed to operate on dusts, sprays, fumes, and mists and can be equipped for recirculation of the liquid scrubbing medium.

Hydro-Filter will maintain a constant high level of efficiency over wide variations in volume of air and heavy dust loads. And because of its simple design, it will provide ease of maintenance *unmatched by any equipment* for similar use.

Write for descriptive bulletin today.

TIRED OF DUST COLLECTOR MAINTENANCE?
. . . YOU'RE READY FOR HYDRO-FILTER

HYDRO-FILTER
National Dust Collector Corporation
601 Machinery Hall Building • Chicago 6, Illinois

Check 5261 opposite last page

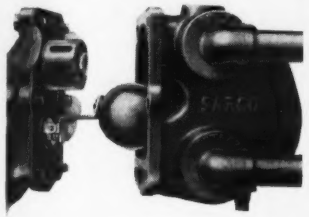
Simplified construction makes steam trap easy to service

Inspection and maintenance are facilitated

Uses: For providing condensate seal and preventing loss of steam.

Features: Entire operating element is one unit which can be removed without disturbing inlet and outlet connection to semi-steel trap body.

Description: Operating elements of improved, float-thermostatic steam trap consists of stainless steel valve

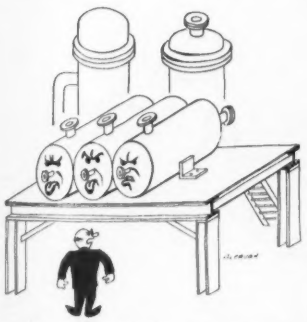


Inspection, maintenance, and installation of float-thermostatic steam trap are greatly facilitated by simplified construction

mechanism, copper float, and bronze thermostatic air vent. Trap is suitable for 125 psi steam pressure.

(Float-thermostatic steam trap is product of Sarco Company, Inc., 350 Fifth Ave., New York 1, New York.)

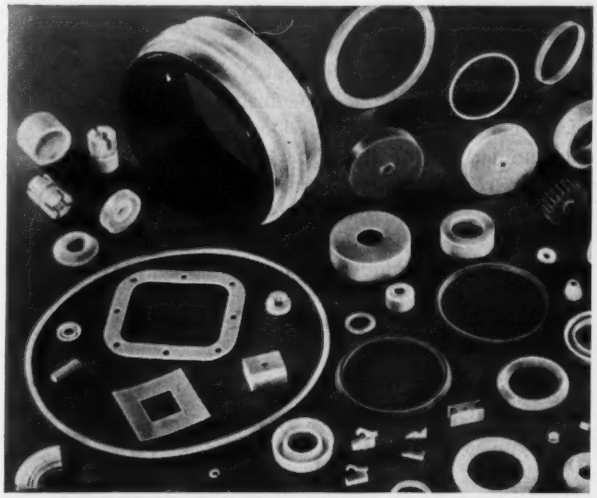
Check 5262 opposite last page.

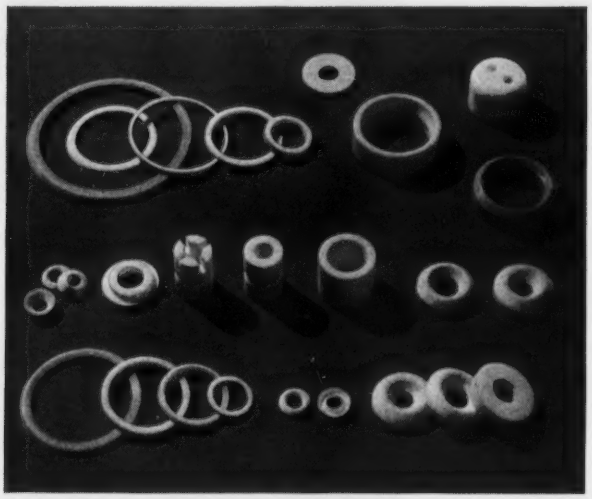


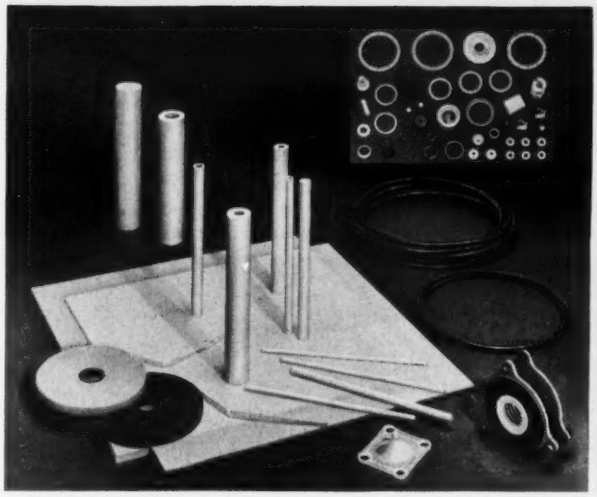
"That painter I fired last week! Get him on the phone!!!"

Thanks to Ann Alpaugh, Vulcan-Cincinnati, Inc., Cincinnati, Ohio.

R/M is your best single source for TEFLON* in any form







Pioneering in the fabrication of "Teflon," R/M has built a solid record of achievement in utilizing the unique properties of this material. Our engineers have done many things previously considered impossible, such as molding very complex valve diaphragms.

In addition to the knowledge and skill of its personnel, R/M has the production facilities to produce "Teflon" in *any* form and quantity you require. Make us your prime source for every "Teflon" product, from sheets, rods, tubes, tape and flexible wire braid covered hose to the most intricate molded and machined components.

No matter how exacting your specifications, depend on R/M to meet them with complete satisfaction. Your nearby R/M district office will be glad to give you the cooperation you need when your project is in the design stage. Or write for free literature and detailed information.

*A Du Pont trademark

R/M

RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION FACTORIES: MANHEIM, PA.; PARAMOUNT, CALIF.

Contact your nearest R/M district office listed below for more information or write to Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

BIRMINGHAM 1 • CHICAGO 31 • CLEVELAND 16 • DALLAS 26 • DENVER 16 • DETROIT 2 • HOUSTON 1 • LOS ANGELES 58 • MINNEAPOLIS 16
NEW ORLEANS 17 • PASSAIC • PHILADELPHIA 3 • PITTSBURGH 22 • SAN FRANCISCO 5 • SEATTLE 4 • PETERBOROUGH, ONTARIO, CANADA

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 5263 opposite last page

Snap*On® pipe insulation specified as result of TEVA survey

TEVA (Thermo-Economic Value Analysis) is Gustin-Bacon's analytical approach to your pipe insulation requirements. TEVA compares G-B Snap*On, the one-piece pipe insulation molded of fine glass fibers, with other insulations *for your particular job.* Thermal efficiency of different insulations . . wall thickness required . . initial and operating savings . . . application conditions —all are analyzed and comparisons made to help you select the insulation best suited to the job at hand.

Why does Snap*On *invite* comparison? Because it has the highest thermal efficiency in its temperature range . . . is far easier to apply because it simply spreads and snaps on pipe . . . is permanent. Snap*On is available in 3-ft. and 6-ft sections, plain or jacketed, for all cold or heated lines, in sizes up to 33". Analyze your requirements—and you, too, will specify Snap*On!

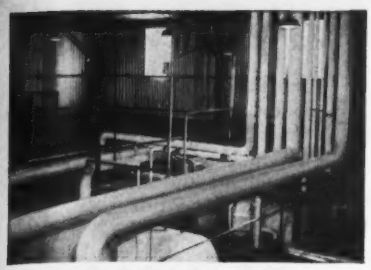
FOR INFORMATION AND FREE TEVA SURVEY, CALL YOUR G-B SNAP-ON DISTRIBUTOR (LISTED IN THE ADJOINING COLUMN)

GUSTIN-BACON *Manufacturing Co.* GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe couplings and fittings • Molded glass fiber pipe insulation

254 W. 10th St., Kansas City, Mo.

For more information on product at right, specify 5264 see information request blank opposite last page.



G-B SNAP* ON DISTRIBUTORS

(See ad on facing page)

ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, Ball Distributing & Engr. Co.
ATLANTA, Ga., Reynolds Aluminum Supply Co.
BALTIMORE, Md., Leroy Insulation Co.
BILLINGS, Mont., Big Horn Supply, Inc.
BIRMINGHAM, Ala., Shook & Fletcher Supply
Reynolds Aluminum Supply Co.
BROOKLINE, Mass., Homans-Kohler, Inc.
BUFFALO, Industrial Insulation Sales, Inc.
CHARLESTON, W. Va., Baldwin Asbestos Products Co.
CHARLESTON HEIGHTS, S. C., Stafford Insulation Co.
CHARLOTTE, N. C., Guy M. Beaty & Co.
CHATTANOOGA, Guy M. Beaty & Co.
CHICAGO, E. C. Carlson Co.
CINCINNATI, R. E. Kramig & Co.
CLEVELAND, The Miles Materials Co.
COLUMBUS, Santeler Brothers
DALLAS, Insulation Supply Co., Inc.
DAVENPORT, Republic Electric Co.
DENVER, Gene Wright Lumber Co.
DES MOINES, Iowa Asbestos Co.
DETROIT, Coon DeVisser Co.
EL PASO, Insulation & Specialties Co.
FARGO, N. D., Smith, Inc.
FT. SMITH, Ark., Gunn Distributing Co.
FT. WAYNE, Ind., M. H. Hilt, Inc.
FT. WORTH, The Bracken Co.
GREENSBORO, N. C., Starr Davis Co., Inc.
GULFPORT, Miss, Paine Supply Co.
HOUSTON, Precision Insulation Co.
INDIANAPOLIS, Central Supply Co.
JACKSON, Miss., Paine Refrigeration & Supply Co.
JOPLIN, Mo., Joplin Cement Co.
KANSAS CITY, Kelley Asbestos Co.
LITTLE ROCK, Gunn Distributing Co.
LOS ANGELES, Western Fibrous Glass Products
Thorpe Insulation Co.
LOUISVILLE, General Insulation & Roofing Co.
MEMPHIS, John A. Denie's Sons Co.
MIAMI, Reynolds Aluminum Supply Co.
MILWAUKEE, F. R. Dengel Co.
MINNEAPOLIS, Asbestos Products, Inc.
MOBILE, Ala., Shook & Fletcher, Inc.
NASHVILLE, Reynolds Aluminum Supply Co.
NEWARK, N. J., Eastern Steam Specialty Co.
NEW HAVEN, Conn., Insulation Supply Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
OMAHA, Cardinal Supply & Mfg. Co.
PHILADELPHIA, John F. Scanlan, Inc.
PITTSBURGH, Dravo Corp.
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
RALEIGH, N. C., Reynolds Aluminum Supply Co.
RAPID CITY, S. D., Robbins & Stearns Wholesale
RICHMOND, Va., Reynolds Aluminum Supply Co.
ROCKFORD, Ill, Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
SAN ANTONIO, The Bracken Co.
SAN DIEGO, Western Fibrous Glass Products
SAN FRANCISCO, Western Fibrous Glass Products
SAVANNAH, Ga., Reynolds Aluminum Supply Co.
SEATTLE, Western Fibrous Glass Products
SOUTH BELOIT, Ill., Mott Brothers Co.
ST. LOUIS, The Stovey Company, Inc.
ST. PAUL, Asbestos Products, Inc.
SYRACUSE, N. Y., Industrial Supply Co.
TAMPA, Fla., Eagle Roofing & Art Metal Works, Inc.
TALLAHASSEE, Fla., Bakers, Inc.
TULSA, Okla., Ball Distributing & Engr Co.
TUPELO, Miss., Paine Supply Co.
WASHINGTON, Walter E. Campbell Co., Inc.
WICHITA, Jamar-Olmen Construction
VANCOUVER, B. C., Fleck Brothers Limited

gb BACON

Frame of safety glasses is durable, long wearing, lenses easily replaced

Plastic and metal open-type frame of manufacturer's safety glasses is reputed to reduce safety equipment costs by providing durable, long-wearing frame in which lenses can be easily replaced. Pads made of polyethylene are light and comfortable, and conform to different contours of the nose. They provide tight closure at nose section which

Lenses can be easily replaced in durable, open-type frame of safety glasses

keeps foreign bodies from entering the eye at this point.

Safety glasses are available in 46 x 39mm and 48 x 41mm eye sizes. Bridge sizes are 20, 22, 24, and 26mm. Lenses are offered in 6.00 curve only.

(Cesco comfort bridge stylist safety glasses are product of Chicago Eye Shield Co., 2300 Warren Blvd., Chicago 12, Ill.)

Check 5265 opposite last page.

Quality control device for insulating material measures in seconds

No calculations required; need access to only 1 side

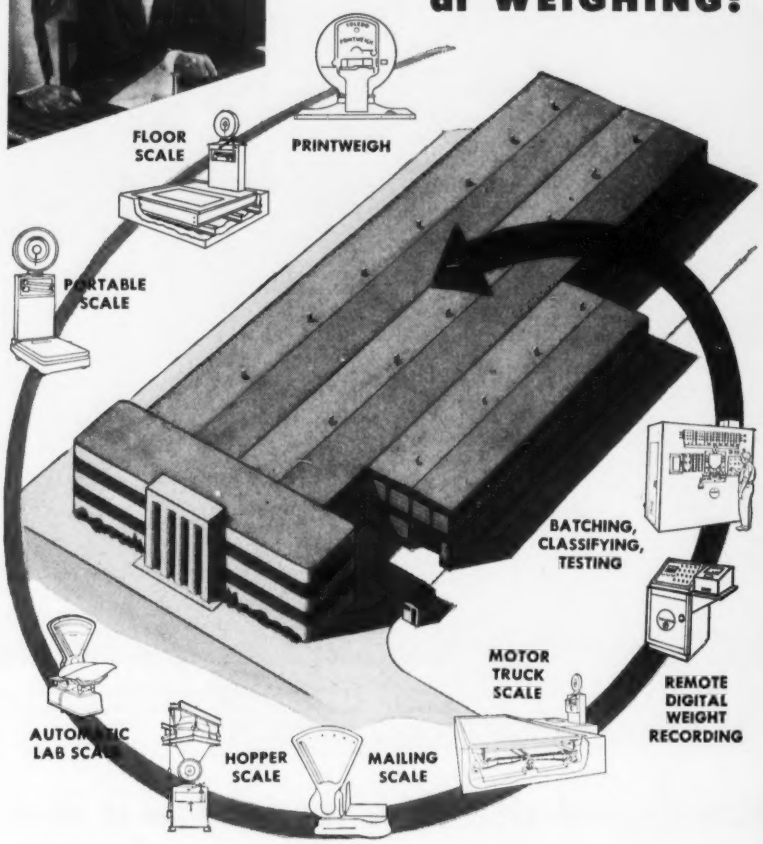
Uses: For measuring the dissipation factor and dielectric constant of insulating materials.

Features: Form of probe associated with instrument eliminates need for special preparation. Consequently, measurements are made in seconds. No calculations are required, and access to system need only be from one side.

Description: Analyzer is portable, non-destructive, direct-reading instrument which can be used to investigate the effects of variables such as

Studying Costs? It pays to start with a

Plant-Wide Look at WEIGHING!



You can lessen the impact of rising costs by making sure your scales are doing the best possible job. Remember that weighing today is not a job for isolated scales—it's a vital element in your overall cost control system.

Weight records directly affect costs, quality, inventory control and customer billing. Weighing errors, or inadequate weight data, can be avoided by having the right scales in the right places . . . all carefully integrated in a plant-wide weighing system to supply basic records on materials received, shipped or transferred. Check your needs now! TOLEDO SCALE, Div. of Toledo Scale Corp., 1423 Telegraph Road, Toledo 13, Ohio.

TOLEDO SCALE *Headquarters for Weighing Systems*

DIVISION OF TOLEDO SCALE CORPORATION

☐ **NEW TOLEDO WEIGHT FACT KIT**

will help you determine how well your scales measure up as a weighing system—help you detect weighing losses that drain profits. Request your kit now. No obligation.

☐ Industrial Scale Line ☐ Electronic Load Cell Scales ☐ Motor Truck Scales ☐ Electronic Remote Digital Weights

☑ WE'LL BE GLAD TO MAIL THE LITERATURE YOU CHECK.

Check 5266 opposite last page

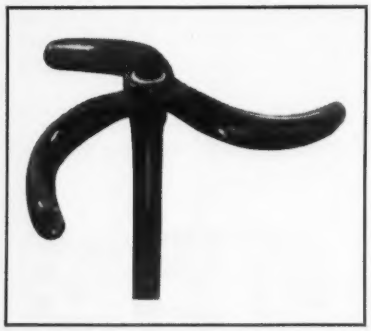
PFAUDLER CORROSIONEERING NEWS

The most advanced reactor design in more than twenty years is the result of a full-time Pfaudler engineering program and a review by the Pfaudler Advisory Board, a panel of outstanding men from the chemical process industries.

New glassed-steel "RSA" reactor now in stock

Separable-blade impeller • Symmetrical top head Pedestal-mount drive • Many other new features

The new "RSA" Series Reactor which you may have seen at the December Chem Show is now ready for delivery from stock.



Separable-blade impeller. You can take the two-piece blade assembly off this impeller shaft without disturbing drive alignment. It takes just minutes to switch blades to meet process requirements. You can also cut inventory considerably, since you need stock only the blades.

This new design eliminates the need for the large top head opening now used on closed-top reactors, freeing space for extra nozzles and a larger manhole.

Symmetrical head. Plumbing and placing "RSA" Reactors in tandem is simpler since the top head is symmetrical. The 1000-gallon unit shown above, for example, has three four-inch nozzles on each side. The angle from a centered eight-inch nozzle is the same for each opposite nozzle. The manhole is 30% larger, measures 14 by 18 inches. A common service line can feed two of these reactors side-by-side with short straight lengths.

New drive. There is no cumbersome, space-consuming tripod on the new "RSA" reactor. Its drive is pedestal mounted and is "pilot fitted" to the head for perfect alignment. The new "BH" Drive comes in 12, 30 and 60 HP sizes. Its helical primary gears and spiral bevel secondary gears provide faster initial speeds and quiet operation. Its wide-spread bearings are all anti-friction types, and reduce run-out.

Lapped flange faces. You save the time of shimming gaskets on nozzle connections since all flange faces are glassed and lapped. You get truer gasket facings which offer safer operation at high pressures and reduce dangerous seepage which might corrode the tank exterior.

Off-center drainage. The bottom head outlet is off-center to put it directly in the agitator sweep path. You get faster, more complete drainage. There are two large-diameter jacket clean-out ports for manual cleaning and inspection.

New baffle holder. There's a new holder to give you larger bearing area and more room for adjustment with both fingertip and beaver tail baffles.

There's even more that's new about the "RSA" Series Reactor, all detailed in Bulletin 960. Write for a copy.

Check 5267 opposite last page

Chlorine dioxide and glassed steel

Chlorine dioxide is much in the news since methods have been devised to safely generate this highly corrosive and explosive oxidizing agent.

Our interest here is natural since making chlorine dioxide involves a host of other corrosives, among them sulfuric acid, sulfur dioxide, methanol and sodium chlorate.

Glassed steel invariably proves to be the most practical and economical material for both handling and storing all these corrosives.

Our experience with the various generation methods is extensive enough for our engineers to set up a complete process including storage tanks, generators, columns, pipe, fittings, valves and pumps.

If you are thinking of using chlorine dioxide for pulp bleaching or water treatment or the bleaching of fats, oils, flour, etc., you will benefit from investigating further the use of glassed steel.

THE PFAUDLER CO.
a division of PFAUDLER PERMUTIT INC.
Dept. CP-58, Rochester 3, N.Y.

See also Chemical Engineering Catalog, pages 1407 through 1410.

hardeners, fillers, and cure conditions in dielectric systems; to detect non-uniformities in electrical properties of insulators; and for monitoring output of continuously operating devices.

Analyzers are available as battery-operated unit for "on the floor" use, or as laboratory instrument with plug-in power supply. Instrument measures 9 x 12 x 9" and weighs less than 15 lb.

("D-K Analyzer" is product of Delsen Corporation, 719 West Broadway, Glendale 4, California.)

Check 5268 opposite last page.

Describes metal gaskets

Features and design factors of manufacturer's spiral-wound metal gaskets, as well as types available for specific applications, are detailed in 12-page bulletin. Charts for suggested sizes in relation to pressures sealed are included. Bul Ad-104 — The Garlock Packing Co., 415 Main St., Palmyra, New York.

Check 5269 opposite last page.

Laminates resist flame and heat, have good electrical qualities

Uses: Phenolic, polyester, and epoxy laminates of varying characteristics for a wide range of industrial applications.

Features: In addition to resin impregnation normally used, products contain special chemical additives that dampen and extinguish flames.

Description: Included in line are paper-base phenolic, glass-mat polyester, and glass-base epoxy resin laminates. Materials are available in a wide range of thicknesses, sheet sizes, and tube and rod diameters (where supplied).

(For more information on flame-retardant plastic laminates contact Continental-Diamond Fibre Corporation, subs. of Budd Company, Newark, Delaware.)

Check 5270 opposite last page.

When handling solvents in high-speed mixing equipment it's hard to avoid splashes, sometimes into employees' eyes. At Narmco, these splashes are rendered non-injurious because . . .

eye-wash fountain guards against eye damage

THEODORE W. WETT, Assistant Editor
With **PAUL RODET,** Safety Supervisor
Narmco Resins & Coatings Co., Costa Mesa, Calif.

Eye-wash station has been used successfully a number of times at Narmco to prevent eye damage after liquid splash

Eye safety is given first consideration at Narmco Resins & Coating Co.'s recently completed 100,000 gal/month, multiple-story mixing facility at Costa Mesa, Calif. Special eye-wash fountain enables workers to self-administer pressure-controlled, clear water directly to his eyes in case of liquid splash from high-speed mixing tanks.

Since a number of potentially hazardous materials, notably toluene, ethyl alcohol, and methyl ethyl ketone, are constantly being mixed in high-speed churns, there is continual danger of these solvents splashing into eyes of employees. Eye wash fountain provides a quick source of relief in event of such splashing.

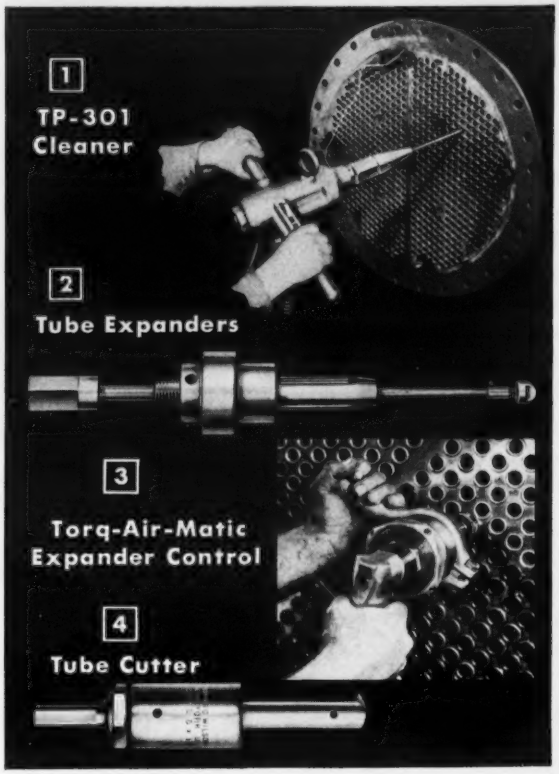
Entire operation at Narmco, which produces structural adhesives and laminating materials, is designed for safety. All electrical equipment, including motors, switches, and cables, is explosion proof. Interior of concrete structure has been treated with a conductive coating material to prevent static electricity from igniting flammable materials. An automatically controlled blower and exhaust system keeps atmosphere constantly free of toxic gases and an automatic sprinkler provides further protection.

Special cut-off switches automatically halt all operations if there is a failure or inter-

◀ Adhesive stock being added to toluene. There is danger of liquid splash. Note explosion-proof motor and switches.

Keep Heat Exchangers on stream with

WILSON
TUBE
MAINTENANCE TOOLS



1 Heavy-duty TP-301 Cleaner is a positive air-driven, hollow rotary shaft, drill type tool. Tube is scavenged with air or water while cleaning.

2 Wilson Models 41 and 44 Tube Expanders incorporate an improved, adjustable ball bearing thrust collar and are designed for efficient, easy rolling and maximum roll length adjustment for various tube sheet thicknesses.

3 New Wilson Torq-Air-Matic is the first and only air-driven tube expander drive that accurately controls tube expansion by directly measuring torque output at the mandrel.

4 Wilson tube cutter is easy to use and does a fast job. Cutter sizes and shanks available to meet all heat exchanger requirements.

Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88. TW-801

Representatives in principal cities
THOMAS C. WILSON, INC.
21-11 44th Ave., Long Island City 1, N. Y.
Cable address: "Tubeclean", New York

WILSON
TUBE CLEANERS • TUBE EXPANDERS

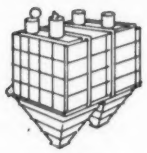
Check 5271 opposite last page

Buell Combination Cyclone-Precipitator installation at cement plant.

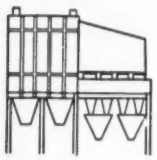
"Paid for itself!"

In nearly all cases, Buell dust or fume collection systems pay for themselves in just a few years. Buell "SF" Electric Precipitators provide extra collection efficiency *and* lower maintenance costs year after year, thanks to features like the exclusive high-emission, self-tensioning Spiral-ectrodes and unique Continuous Cycle Rapping. For specific information about dust collection efficiency and all three Buell systems, write for a copy of the booklet, "The Collection and Recovery of Industrial Dusts." Dept. 11-5, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

BUELL CYCLONE



"SF" ELECTRIC PRECIPITATOR



PRECIPITATOR-CYCLONE COMBINATION

buell®

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

Check 5272 opposite last page

ruption within blower-exhaust system.

Mixing facility contains two hot-jacketed mixing churns, 100 and 300 gal; and four cold-jacketed mixing churns, 250, 125, and two 100 gal. Four additional service mixers are used for processing resins and elastomeric compounds for tower-coating laminating materials, and a resin kettle serves to advance chemical stage of resins during processing. A variety of portable propeller mixers are included for limited and experimental runs as well as pebble mills for special mixing.

Solvents are pumped from 10,000-gal toluene, 7500-gal methyl ethyl ketone, and 5600-gal alcohol underground supply tanks.

Installation was designed by company's engineering department and is capable of accommodating an extremely wide variety of substances ranging from very light viscosity materials to heavy, dough-like materials. Formulations are held within a range of plus or minus 0.5% solids content.

Eye-wash fountain was selected on basis of success of units being used by other divisions of the company. It has been used several times to prevent eye injury from splashes and has proved consistently satisfactory in all respects.

(Eyewash fountain is a product of Haws Drinking Faucet Co., 1439 Fourth St., Berkeley 10, Calif.)

Check 5273 opposite last page.

ASTM viscosity tables

Tables in 65-page booklet provide convenient means for viscosity conversions and for obtaining basic values for calculation of viscosity index. Tables will be useful to petroleum chemists, lubrication engineers, and production personnel. To obtain ASTM Special Technical Publication 43-B, remit $2.00 direct to American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Check 5274 opposite last page.

All-Dynel work fabrics stain resistant

Garments will not 'cling' on low-humidity days

Uses: In protective clothing for employees working with such chemicals as sulfuric, hydrochloric, and chromic acid, sodium hydroxide, alkalis, and salts.

Features: Strength and chemical resistance of Dynel fiber are combined with special finishes. Anti-static compound protects against build-up of static electricity so that garments will not "cling" on days of low humidity. Also danger of sparks in areas with explosive atmospheres is lessened. Silicone finish imparts durable water-repellancy, spot, and stain resistance.

Description: Fabrics are 100% Dynel and available in plain weaves, flannels, herringbone twills, and basket weaves in a complete range of brown and gray shades. Line will be produced in eight-ounce weights, 45 inches wide.

(Dynadure fabrics are a product of Industratex Div., Chrysler Textiles, Inc., 49 W. 37th St., New York, N.Y.)

Check 5275 opposite last page.

Indentification feature of plastic shim stock speeds work

Uses: As material for gaskets and shims.

Features: Plastic stock is furnished in six basic gages, with each thickness identified by both gage number and distinctive color. This insures instant identification, minimizing errors and speeding work.

Description: Cellulose triacetate stock is impervious to oil and water, dimensionally stable, and does not lose strength or form in service. It is uniform in gage and has a decomposition point in excess of 400°F.

(Wil-Pak plastic gasket and shim stock is product of Chicago-Wilcox Mfg. Co., 7701 S. Avalon Ave., Chicago 19, Ill.)

Check 5276 opposite last page.

WHERE CORROSION CHEWS CONCRETE

Repair **economically with . . .**

NEW Penntrowel Surfacing Compounds

You mix PENNTROWEL's ingredients right at jobsite, in amount needed . . . then just trowel it on!

Before you call for a jack-hammer job on severely corroded concrete, try troweling on a tough, corrosion-proof surface of new PENNTROWEL. You'll find that you can now *repair* corroded surfaces . . . quickly and economically, with long-lasting results.

PENNTROWEL gives unmatched corrosion protection to all concrete, brick and cement surfaces. Material cost is as low as 69c a square foot, for PENNTROWEL Regular Grade applied 3/32" thick. Costs for normal surface preparation and mortar application average only 30c to 65c per square foot.

PENNTROWEL has been plant-proved by Pennsalt's own Maintenance Engineers. Surfaces are exposed to rugged service in our plants, which make strong acids, alkalis and solvents. Replacement was a high-priced headache until we developed PENNTROWEL, used it effectively for both repair and preventive maintenance.

PENNTROWEL surfacing materials are available in three grades—for corrosion protection, for fluorine service, and for heavy wear.

Write **for new descriptive folder today! Ask for Bulletin CP-627**

Corrosion Engineering Dept. 623
PENNSALT CHEMICALS CORPORATION
Three Penn Center, Philadelphia 2, Pa.

Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Pennsalt Chemicals
ESTABLISHED 1850

Check 5277 opposite last page

Workers willingly wear *comfortable* knit-cotton lined **PIONEER** Liquidproof Gloves All Day

NL-34 NL-42 NL-52 VL-34 NS-35*

Pioneer Knit-Cotton Lined Gloves with Non-Slip Grip

Style	Material	Weight	Color	Lining	Length
Stanzoil NL-34	Neoprene	Light	Blue/Black	Knit Cotton	10½"
Stanzoil NL-42	Neoprene	Heavy	Blue/Black	Knit Cotton	12"
Stanzoil NL-52	Neoprene	Heavy	Blue/Black	Knit Cotton	14"
Stanflex VL-34	Pylox	Medium	Red	Knit Cotton	10½"
Stanzoil NS-35	Neoprene	Light	Red	Cotton Flock*	10½"

Write for our Industrial Glove Line Catalog and price list and the name of your nearest Pioneer Distributor. If you have a hand protection problem send a description to our "Hand Protection Clinic" for our glove recommendation.

the **PIONEER** Rubber Company
241 Tiffin Road, Willard, Ohio

Check 5278 opposite last page

ENGINEERING & SAFETY

Document reproduced in one-third normal operating time

Original and photocopy paper need only one insertion

A one-step copier capable of reproducing an original document in one-third the normal operating time of conventional photocopy machines has been developed. Original copy and photocopy paper are inserted only once, rather than twice. Improvements in photocopy paper and chemical concentrate also contribute to the more efficient operation.

Operation is simplified and copy reproduction speeded up with one-step photocopy machine

Photocopy machine weighs approximately 34 lb, is 7" high, 13½" deep, and 21" long. All essential working parts are made of stainless steel, and the housing is of Melamine. The unit operates on normal electric current and is pushbutton controlled.

(Uni-matic "Auto-Stat" is product of American Photopy Equipment Co., 1920 W. Peterson Ave., Chicago, Ill.)

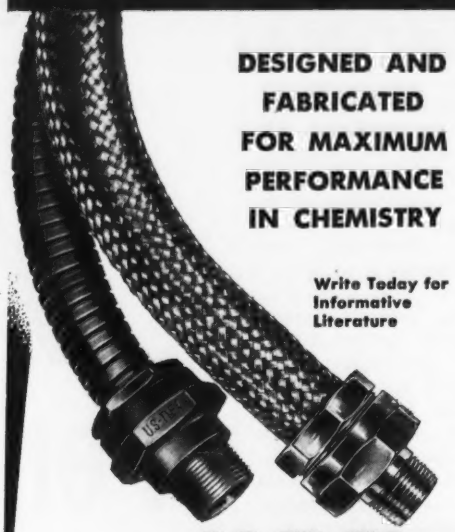
Check 5279 opposite last page.

Axial compressors

Design and construction features of manufacturer's axial compressors available in sizes from 8000 to 1,000,000 cfm are described in 12-page Bul 16B-8863 — Allis-Chalmers Mfg. Company, Milwaukee 1, Wis.

Check 5280 opposite last page.

STAINLESS
Flexible Metal Hose and Components



DESIGNED AND FABRICATED FOR MAXIMUM PERFORMANCE IN CHEMISTRY

Write Today for Informative Literature

U.S.Flex

U.S. FLEXIBLE TUBING CO.
219 MAIN STREET BARTLETT, ILLINOIS

Check 5281 opposite last page

NO Dura-Buket* has ever worn out

*Special Plastic by Fiberite Corp.

AFTER ONE YEAR ON THE SAME JOB

Proved and IMPROVED: Yes, four years of continued research and testing under actual severe conditions, have proved that the revolutionary improved Dura-Buket outwears, outlasts ordinary elevator buckets many, many times. Dura-Buket is better than ever because it's made of a special strong and shock resistant plastic developed by the *Fiberite Corporation.* Order your supply today.

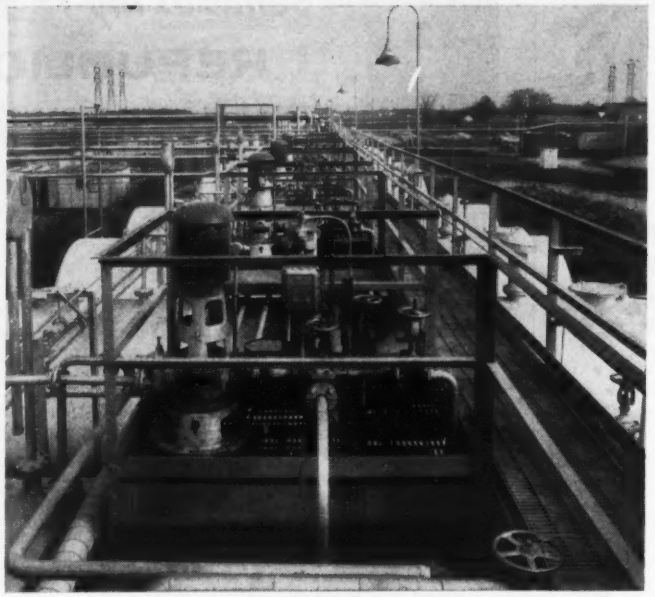
And Dura-Buket gives you these important trouble and money-saving extras.

1. Special impact-resistant plastic by Fiberite.
2. Strong and shatterproof.
3. High speed and lightweight.
4. Spark and static-proof for safety.
5. Self-cleaning for high sanitation.
6. Can't corrode.

FOR COMPLETE INFORMATION AND PRICES WRITE TO

Dura-Buket DIVISION
NATIONAL OATS COMPANY
EAST ST. LOUIS, ILLINOIS

Check 5282 opposite last page



These twelve self-priming centrifugals have served dependably, handling alcohol and plasticizers

Foundation of virtually continuous operation of B. F. Goodrich Chemical Co.'s Avon Lake plant has been dependable service of self-priming centrifugals used to transfer raw materials from storage to production. Units have a record of ...

trouble-free service pumping alcohols and plasticizers

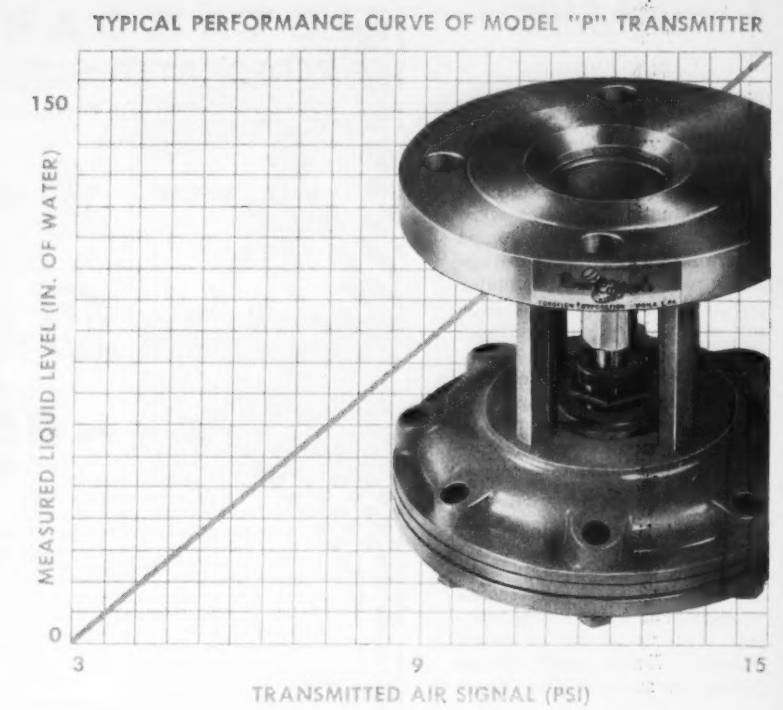
THEODORE W. WETT
Assistant Editor
With **OWEN BECKMEYER**
Plant Manager
B. F. Goodrich Chemical Co.
Avon Lake, Ohio

Twelve vertical self-priming, centrifugal pumps have proved their dependability during several years of practically continuous service at B. F. Goodrich Chemical Co.'s Avon Lake, Ohio, plant. Pumps have been called upon to deliver from 50 to 100 gpm of alcohol, plasticizers, and blending liquids from outside storage for production of plastics, vinyl resins, and chemical and pharmaceutical intermediates.

Among the problems met successfully by units was handling of plasticizers which thicken when temperature drops. Pumps are mounted some 20 ft above ground on top of large storage tanks. There have been no instances where they failed in their self-priming operation.

Year-round Operation

The plant is made up of widely dispersed storage, mixing, and processing units. Operation is on a round-the-year



NEW

CONOFLOW
LIQUID LEVEL
& PRESSURE
TRANSMITTER
WITH
Exclusive
ISOLATED
MEASURING
DIAPHRAGM

The Conoflow Model "P" Transmitter is a rugged instrument which measures pressure and liquid level and transmits a *linear* 3-15 psi signal to standard receiver elements. Incorporates these cost-saving features:

Safety—Process liquids and gases cannot back up through air lines and damage costly instruments. This is guaranteed by the complete separation of measuring diaphragm from pneumatic pilot.

Simple Installation—The Model "P" can be mounted either horizontally or vertically on open or closed vessels. No dip tubes, floats or other mechanical devices are required inside the tank.

Long Life—Only the corrosion-resistant *Inconel X* diaphragm is exposed to the measured material. Preformed diaphragm will not work-harden or fatigue; withstands pressures to 500 psi and temperatures to 450°.

Versatile—Can be used for practically any service; ideal for viscous fluids or materials with solids in suspension; also for flowing bulk materials such as pigments, flakes, etc.

Choice of Ranges—Available for measuring ranges as low as 0 to 100" of water and pressures as high as 250 psi. Ranges can be changed in the field.

Specifications—Bulletin P-2520-3 contains complete specifications on the Conoflow Model "P" Transmitter. Write for your copy today or let us quote on your requirements. No obligation. Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa.

CC-802

Cono-Controls® | CONOFLOW CORPORATION | FOREMOST IN FINAL CONTROL ELEMENTS | SUBSIDIARY OF WALWORTH

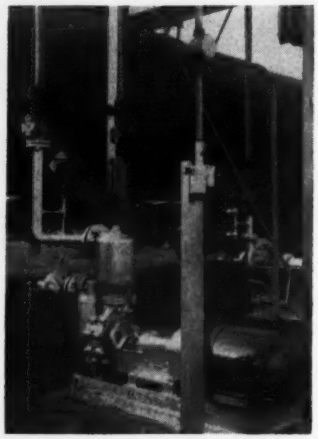
Check 5283 opposite last page

basis with most units in action on a 24-hour schedule. recently was expanded to meet growing demand for products. Although buildings and production facilities were doubled, the dozen pumps crowning row of storage tanks which hold the major portion of raw material supply easily handled additional demand.

Goodrich also relies on two smaller horizontal pumps to transfer mixing materials, primarily acetone and alcohol, from tank cars to storage tanks.

Vertical Units Packingless

Large vertical units are packingless. They are sealed in operation by a kinetic liquid seal using liquid being pumped. Drive shaft enters pump on suction side. Shaft



Horizontal pumps transfer acetone and alcohol from tank cars to storage

seal under suction lift conditions is thus required to work only against atmospheric pressure.

This seal is never subject to and is unaffected by discharge pressure.

Only maintenance required in more than nine years of operation has been the "normal" replacement of a few bearings.

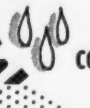
(Self-priming centrifugal pumps were supplied by The LaBour Co., Inc., Elkhart, Indiana.)

Check 5284 opposite last page.

STANDARD
PERFORATED SCREENS
precisioneered for resistance . . .

to PRESSURE

to CLOGGING



to CORROSION

to HEAT

Precision made for on the job durability is an outstanding feature of Standard Perforated Screens. Standard's long-life factor adds economy to your processing operations, the precision perforated quality so necessary to any chemical operation involving screens . . . filtering, straining, vibrating, sizing, etc. Specify Standard Perforated Screens for increased production of better quality materials at lower cost. Choose from stock designs or Standard will perforate to your specs. Send prints for free estimate . . . at no obligation, of course.

WRITE FOR NEW, FREE PERFORATED METAL CATALOG!

STANDARD
STAMPING & PERFORATING COMPANY
3117 West 49th Place, Chicago 32, Illinois

Check 5285 opposite last page

I sent for my FREE
REPUBLIC
ELECTRUNITE
WELDED STAINLESS STEEL TUBING AND PIPE CHART

You, too, can get this big 18½ x 20½" wall chart free. Filled with facts, figures and fingertip information—decimal equivalents, tolerances, physical properties and chemical analysis for all sizes and shapes of Republic ELECTRUNITE® Welded Stainless Steel Tubing and Pipe. Attractive, easy to read. And it's FREE!

Send For Your Big 18½ x 20½" Chart Today!

REPUBLIC STEEL
STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio

Check 5286 opposite last page

Operates in high and sub-zero temperatures—as high as 450°F, and as low as —100°F.

What other flexible hose assembly gives you all of these advantages?
The answer is none!

Teflon*

Corrosion resistant—fitting materials and Teflon* innercore will handle a wide variety of chemicals, solvents, oils, hydraulic fluids, fuels.

Excellent lubricity—Teflon has a slippery surface. Easy to clean, won't clog, less pressure drop.

FROM END TO END . . . INSIDE AND OUT

CHECK YOUR SAFETY CANS
for safety's sake

QUANTITY • CONDITION • PROPER USE

JUSTRITE
the complete line of genuine, approved** safety cans...

REMEMBER
5 gal. of gas. explode with the same force as 415 pounds of dynamite!

TODAY'S GREATER USE OF SOLVENTS HAS INCREASED YOUR NEED FOR:

SAFETY CANS: Rugged, super-strong for greater safety, longer life in handling flammable liquids. 7 sizes: 1 pt. to 5 gal.

OILY WASTE CANS: Prevent spontaneous combustion fires. Designed for max. air circulation. 5 sizes: 6 gal. to 40 gal.

BENCH CANS: New design! Portable parts basket speeds handling small parts, keeps hands dry. Use as ½-gal. or gallon unit.

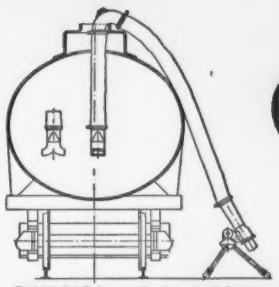
PLUNGER CANS: Dispense flammable liquids safely! Adjust to control amount used. Cleans easily. 3 sizes: Qt., ½-gal., or gallon.

**"Underwriters' Labeled, Factory Mutuals Approved

JUSTRITE MFG. CO.
Chicago 14, Ill.
Dept. S-58

Your Dependable Local Industrial Distributor has:
JUSTRITE

Check 5287 opposite last page



TANK CAR is easily freed of fumes for workers' safety.

CHEMICAL STILL is here ventilated while being repaired.

KEEP AIR FRESH
in confined places with COPPUS
Design "A" Ventilator

Improve workers' safety—health—comfort—efficiency. Get rid of dangerous gases, fumes, stagnant air. Coppus Design "A" Ventilator ventilates tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments, fuselages. For complete information, write Coppus Engineering Corporation, 385 Park Ave., Worcester 2, Mass. Sales Offices in *Thomas' Register.*

Other "Blue Ribbon" Products in *Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory* and *Mining Catalogs.*

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

Check 5288 opposite last page

Titeflex Springfield "140"

The Teflon innercore makes Springfield "140" hose assemblies extremely flexible. Long fatigue life.

Hose Assemblies with Reusable Fittings

Springfield "140" Teflon Hose Assemblies are approved for 1500 psi systems. Nominal hose diameter ¼" to ¾". Male pipe and J I C female swivel fittings available from stock.

In which of these applications can you use Titeflex Teflon?

- Acid handling
- Hot waxes and fats
- Liquid adhesives
- Silicone oils
- Chemical processing
- Food and beverage processing
- Steam lines
- Hydrogen peroxide
- Hot lacquers and enamels

Look in the yellow pages of your directory for the Titeflex distributor nearest you, or write direct for Titeflex Springfield "140" Catalog Supplement

TITEFLEX, INC., 509 HENDEE STREET, SPRINGFIELD, MASS.

Long life—Springfield "140" is unaffected by aging. Shelf life is practically unlimited.

*Teflon is a DuPont trademark for its tetrafluoroethylene resin.

. . . MADE RIGHT IN OUR OWN PLANT

Check 5289 opposite last page

Valves provide fast response, leak-free operation

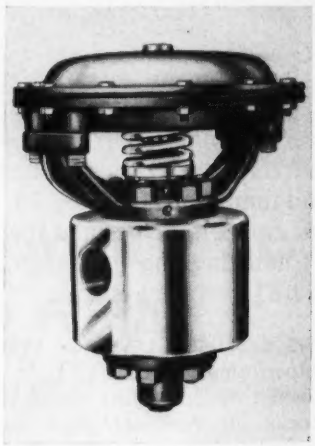
Smooth, shock-less opening, and closing

Uses: As control valves on plastic molding, ceramic forming, and similar equipment requiring extremely high operating pressures.

Features: Units provide fast response, leak-free operation plus smooth, shock-less opening and closing at maximum rated pressure.

Description: Line of 6000 psi 2- and 3-way control valves have bodies machined from solid aluminum bronze bar stock.

Stem seats are Stellite faced. Valves are available in ½ through 2 in NPT sizes and suitable for control of high-



Aluminum bronze bar stock body and Stellite-faced stem seats are featured on 6000 psi control valve

pressure fluids. They can be used with any applicable pneumatic or electro-pneumatic cycle control device, or for manual operation. Valve diaphragm is actuated by 35 to 40 psi air.

All valves are offered either normally open, or normally closed, with fully balanced stems.

(Control valves are product of Sinclair-Collins Valve Co., 454 Morgan Ave., Akron 11, Ohio.)

Check 5290 opposite last page.

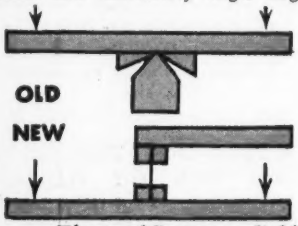
New Valentine Division Plant of A. P. Green Fire Brick Company

Heavy, sticky, lumpy materials batched with high accuracy

Heavy duty batching system requiring little headroom is also capable of handling flooding powders

DO YOU HAVE A BATCHING PROBLEM more difficult than accurately mixing raw clays and grogs which vary from oozy-wet one day to rock-hardness the next? Thayer solves such a rough-and-tumble problem by 1) engineering all the component feeders, hoppers, scales and their automatic controls as one unit and 2) utilizing the unchanging precision of the patented Thayer Plate Leverage System.

THIS EXCLUSIVE LEVERAGE SYSTEM outperforms all others. It is not affected by dust, dirt, vibration or shocks. *An extremely high degree of reliability is maintained* through the use of patented non-fatiguing Thayer Flexure Plates instead of vulnerable knife-edge pivots.



THAYER AUTOWEIGHTION is accepted as the most reliable system of batching or continuous formulating. Thayer Scales have performed millions of weighing operations without maintenance, loss of accuracy or diminished sensitivity.

The world's most reliable leverage system is also available in Thayer filling and checkweighing scales.

THE Thayer SCALE

*THE THAYER SYSTEM OF PROCESS CONTROL BY WEIGHT

AUTOWEIGHTION

THE THAYER SCALE CORP., 6 Thayer Park, Pembroke, Mass.

Check 5291 opposite last page

Whether you require a liter flask of gas for laboratory work... or a manifold supply for your plant

Matheson 76 Compressed Gases

The Matheson Company, Inc.

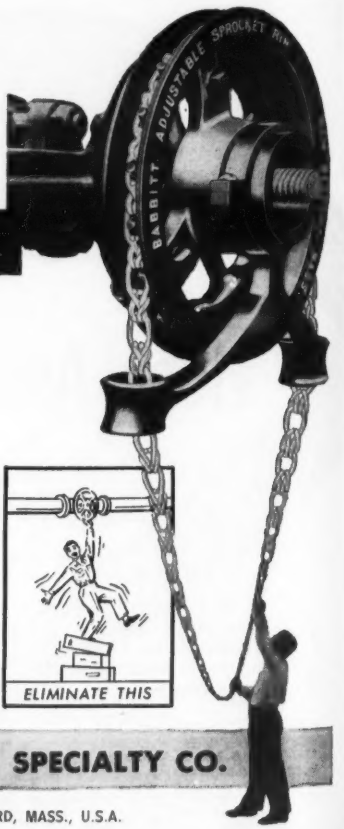
Compressed Gases and Regulators — East Rutherford, N. J.; Joliet, Ill.; Newark, Calif.

Check 5292 opposite last page

Safe Operation of Overhead Valves with a Babbitt

Adjustable
SPROCKET RIM
with Chain Guide

- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices



Babbitt STEAM SPECIALTY CO.

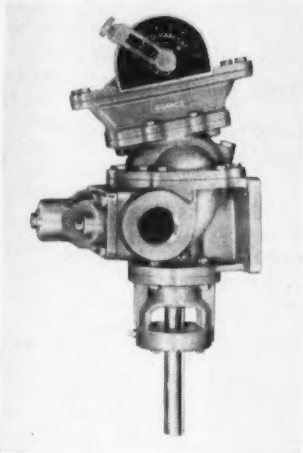
14 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

Check 5293 opposite last page

Pump capacity changed by simple dial setting

Uses: For blending and processing operations, such as fuel oils, caustics, additives, and various other chemical products.

Features: Capacity of unit can be changed to suit product being pumped by simple dial setting. Slide rule calculations or gear changers are unnecessary.



Simple dial setting changes capacity of pump to suit product being pumped

Description: Speed of variable capacity metering pump can be adjusted to handle products of varying viscosities. Operation can be powered from standard capacity motors and differential taken up in pump's adjustment. Range of adjustment is from zero to 40 gpm, at 500 rpm.

(Vari-Cap pump is product of Granberg Corporation, 1308-67th Street, Oakland 8, Calif.)

Check 5294 opposite last page.

Hydrogen peroxide

Detailed information for safe handling of hydrogen peroxide in 30-gal drums is presented in four-page Bul A-945 — Columbia-Southern Chemical Corp., Subs. of Pittsburgh Plate Glass Co., 632 Fort Duquesne Blvd., Pittsburgh 22, Pennsylvania.

Check 5295 opposite last page.

New blower...its cast Inconel hub takes stresses of 3500 RPM spin in hot corrosives

It spins at 3500 RPM in a fiery, corrosive-gas-laden environment.

That's why this new blower, made by Buffalo Forge Company for a major chemical producer, is made of Inconel* nickel-chromium alloy parts.

Inconel alloy provides a high combination of strength and corrosion resistance at high temperatures.

Inco foundry casts critical hub

Buffalo Forge took no chances with the most critical part in the blower. To be *sure* that exacting specifications were met, they had the makers of Inconel alloy make the hub casting. As long-term customers of Inco's Bayonne, N. J. foundry, they knew they could depend on Inco to produce a sound, uniformly strong casting; one that would bring out the best that was in the alloy.

Take a tip from Buffalo forge...

When you design for extreme conditions, consider the properties of Inconel alloy. And, if the part is to be cast, call on Inco to cast it.

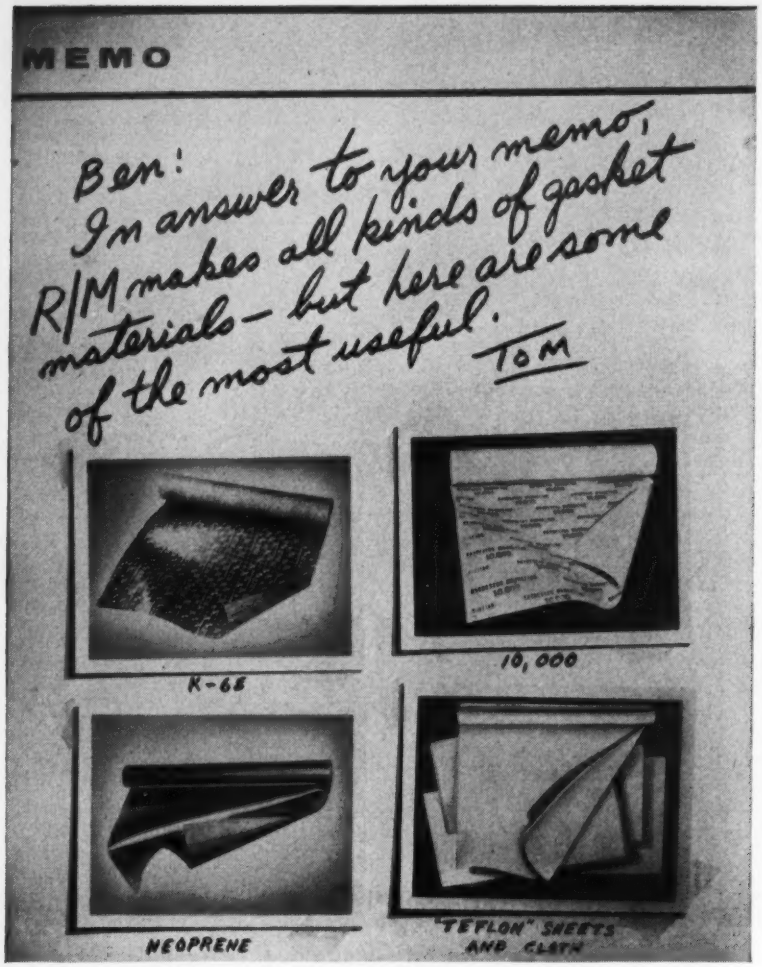
A 9-page Inco technical bulletin, "Engineering Properties of Cast Inconel Alloys", gives the data you need...compositions, physical properties, machining procedures, and much more. We'll be more than glad to send you a copy. *Registered trademark

The International Nickel Company, Inc.
67 Wall Street New York 5, N.Y.

INCO TRADE MARK

INCO-CAST PRODUCTS

Check 5296 opposite last page



A big advantage to you is the years of experience behind R/M gasket materials. R/M's engineers, who have custom designed packings and gaskets for every industry, are familiar with the problems you face and their solutions. You will find those solutions—in many cases—in R/M gasket materials described here. Where these materials do not exactly meet your requirements, feel free to call on R/M engineers for help.

K68—Recommended for use with hot oils, solvents of the gasoline and toluol types. A highly flexible, smooth-surfaced fiberized asbestos-Neoprene combination containing no sulfur.

10,000—Excellent for use where temperatures or pressures are extremely high or where flanges must be narrow. The strongest compressed asbestos sheet packing on the market. Made of Canadian long crude asbestos fibers and the best grade natural rubber. Has outstanding aging characteristics and a tensile strength of 10,000 psi.

Neoprene—Formed into gasket sheets by R/M in a wide range of hardnesses and densities. Resists most oils (except chlorinated, aromatic and ketone) and temperatures up to 250°F or higher.

"Teflon"* Sheets—Show no reaction to chemicals within the temperature range of –80° to 500°F, unaffected by any known industrial acids and caustics. Has no known solvent; nonadhesive, noncontaminating.

"Teflon" Cloth—Asbestos cloth impregnated with "Teflon" or glass cloth coated with "Teflon," for a combination of the desirable characteristics of each.

*A Du Pont trademark

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—Vee-Flex,* Vee-Square,* Universal Plastic, and "versi-pak"*; GASKET MATERIALS; "TEFLON" PRODUCTS, including flexible wire-braided and rubber covered hose. SEE YOUR R/M DISTRIBUTOR.

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings Brake Blocks • Clutch Facings • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 5297 opposite last page

Greater tensile strength, elongation, permeability with urethane foam

Uses: For insulation, cushioning, filtration, and other industrial applications.

Features: Some varieties of foam have greater tensile strength and elongation than conventional urethane types. Rigid types have exceptionally high permeability.

Urethane foam development is claimed to have superior characteristics

Description: Urethane foam is available in several types. It has an open-pore structure, wool-like feel, and drape not found in other foams.

("Scottfoam" is a development of Scott Paper Company, Chester, Pa.)

Check 5298 opposite last page.

Outwears steel 60-1, cast without heat or pressure

Self-lubricating material resists acids, alkalies, solvents

Uses: For lining tanks and repairing chemical equipment; building up surfaces subject to severe wear; and making duplicating masters and forming dies.

Features: Material is claimed to outwear steel 60 to 1, yet can be cast without heat or pressure. It resists most acids, alkalies, solvents, and other chemicals.

Description: Thermosetting resin containing fillers and internal lubricants is supplied in paste form. Upon addition of hardening agent, it becomes a syrupy liquid which can be cast or poured into a variety of shapes.

Two hours after the addition of the hardening agent, material becomes so tough and rigid that it cannot be machined except with carbide or similar tools.

No heat or pressure are required for hardening. The shrinkage of a 4 x 3 x 1" block, for example, is only 0.0002/in. Material is supplied in 1-, 4-, and 15-lb containers.

(Devcon WR is product of Devcon Corporation, Danvers, Massachusetts.)

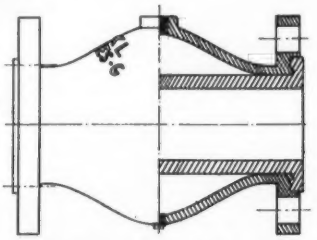
Check 5299 opposite last page.

Maintenance eliminated with pinch valve

No moving parts; gas-tight shut-off

Uses: Valve is for on-off service only.

Features: Because it has no moving parts, unit is completely maintenance free. Hydraulic or air pressure applied between housing and insert collapses insert on itself to give gas-tight shut-off on



Maintenance-free pinch valve gives gas-tight shut-off on powders, acids, or slurries

powders, acids, or slurries.

Description: Pinch valve consists of two pieces, an outer cast iron or aluminum housing and a specially designed flanged flexible insert. Valve is available with pure gum rubber, Neoprene, buna, butyl, or Hypalon inserts having standard 150# ASA flanges in sizes one through eight inches.

(Series "G" pinch valve is product of RKL Valve & Manufacturing Company, Route 38 and Rudderow Avenue, Maple Shade, New Jersey.)

Check 5300 opposite last page

GOT PROBLEMS?

Interested in solving them?

Want to learn new ways of handling tough plant operation problems?

See . . .

CP's "New Solution" section as well as stories in other sections for the answers you need.

In each issue of CHEMICAL PROCESSING you will find numerous stories that will help you solve many of your problems.

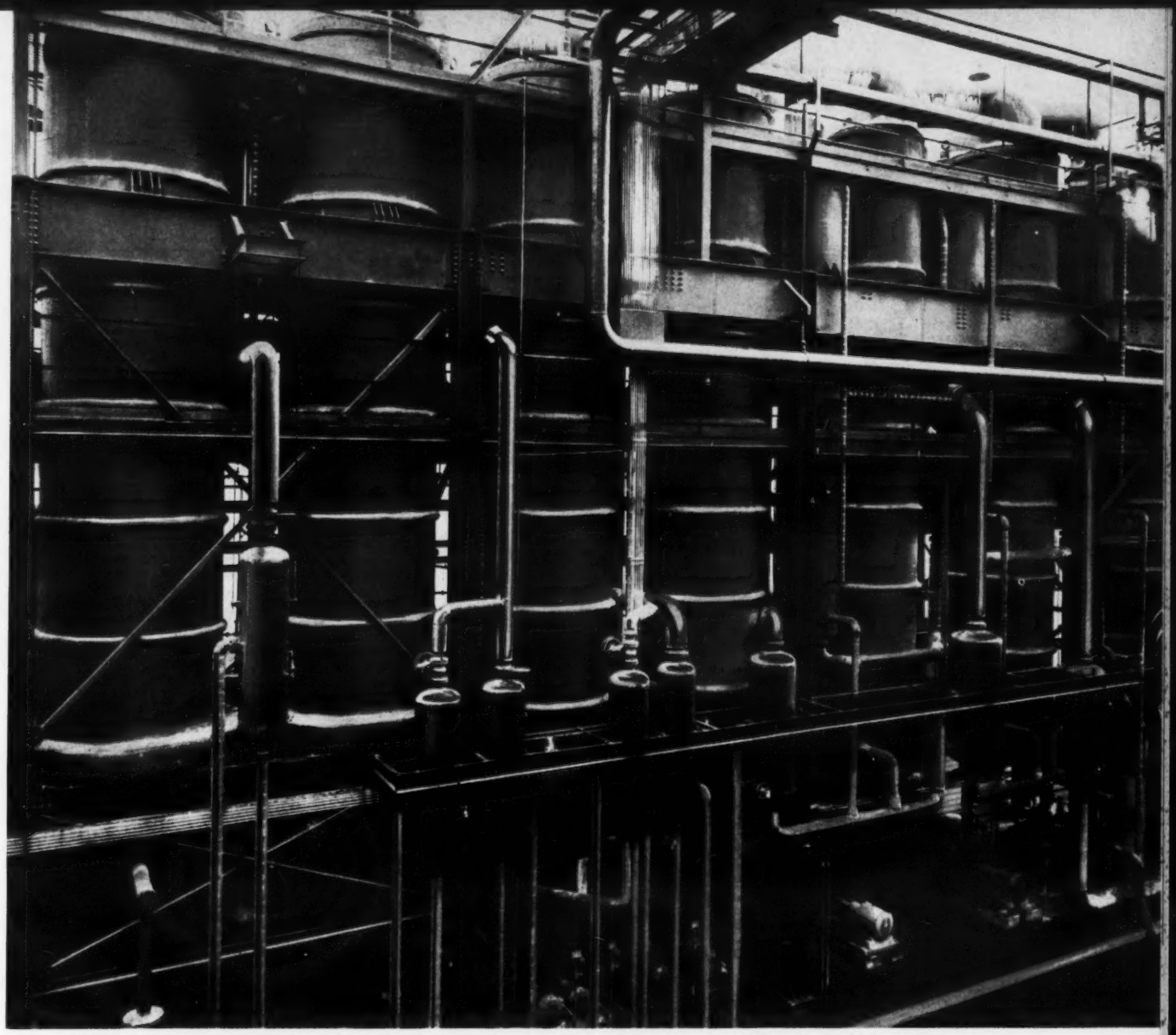
You will find these highly informative stories covering all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion to name a few.

These are specific case histories of how processing problems were solved, how someone else has solved the same difficult tasks that you may have.

Each . . .

"New Solutions" article states the operating problem . . . explains how it was solved . . . and describes results obtained.

For more information on product at right, specify 5301 see information request blank opposite last page.



Paper mill handles waste liquor from 400 tons of pulp per day in a Buflovak Septuple Effect Evaporator. With a total heating surface of 66,500 square feet, this especially designed unit evaporates 6.3 pounds of water per pound of steam.

Longview Fibre Company cuts steam needs with unique Buflovak Evaporator

Saved: 2,500 pounds of steam per hour in concentrating waste black liquor. In designing and building this giant, septuple effect evaporator, Buflovak engineers used three vapor heat exchangers to lower steam requirements . . . boost operating efficiency.

Waste solids produced by the Buflovak evaporator can be eliminated profitably. Instead of creating a difficult disposal problem these wastes are burned as an auxiliary boiler fuel.

Processing economies like these are typical of Buflovak job-engineered evaporators. Because Buflovak builds a full evaporator line, you are sure of an impartial recommendation based exclusively on your needs.

Pre-test your evaporating process in Buflovak's Customer Service Laboratory

This fully equipped research center contains both small scale and pilot size testing equipment. Whether you examine a beaker of material or make a full scale production run, you'll get dependable results, accurate data . . .

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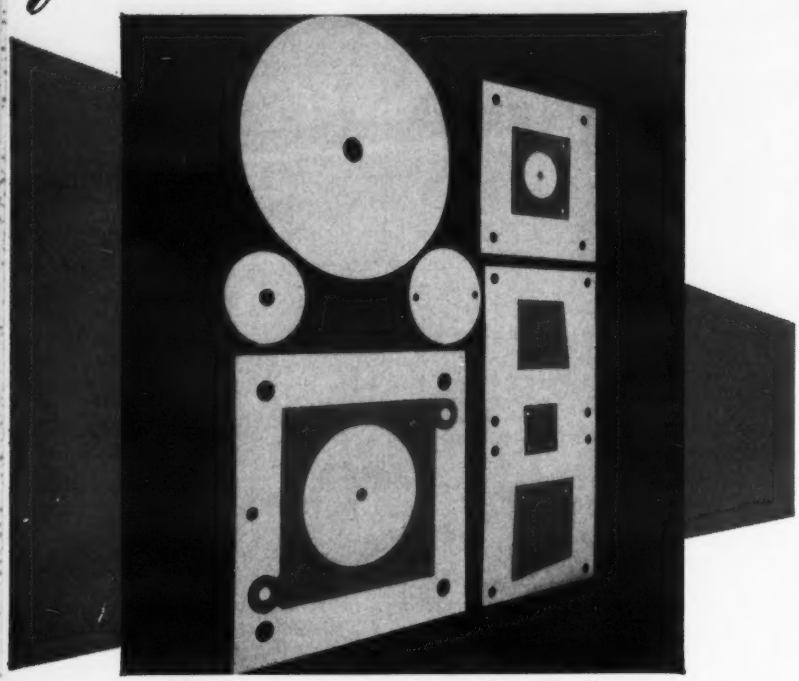

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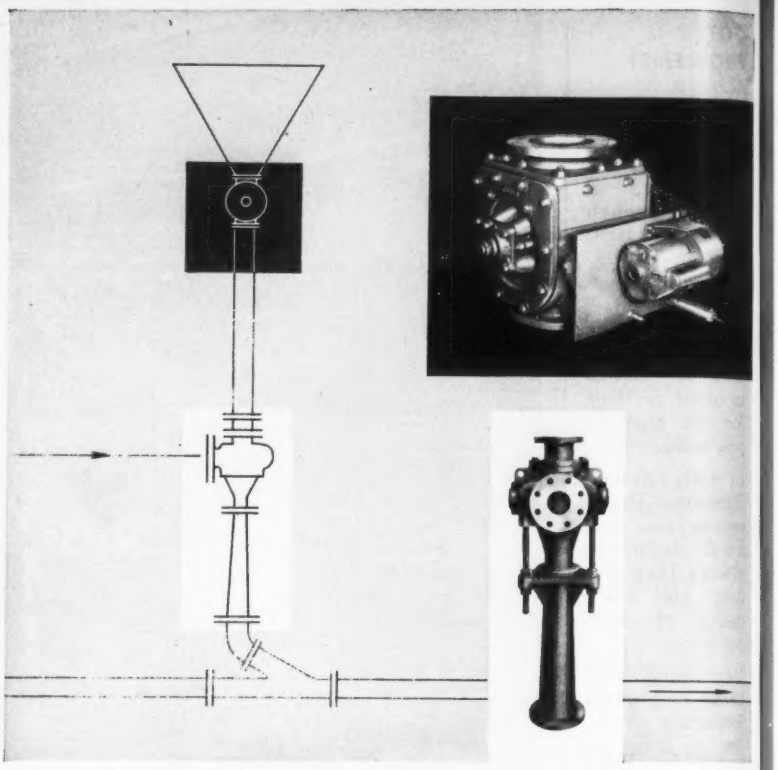

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Here is a practical solution to a chemical materials handling and mixing problem—worked out with A-S-H equipment for the process industries.

The problem was to transport two chemicals—a dry, granular solid and a liquid—to a tank. By feeding the solid through an A-S-H Rotary Feeder and mixing with an A-S-H Low Pressure Hydrovactor, the process engineer was able to *mix in transit.*

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MATERIALS HANDLING EQUIPMENT

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recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Plastics Engineering Technical Papers VOL. IV — 1958

Copies of the 101 technical papers presented at the Fourteenth Annual Technical Conference of the Society of Plastics Engineers, held in Detroit, Michigan, in January 1958, are bound in this hefty 1040-page volume.

The papers are grouped according to their interest. Topics that are covered include: radiation, new materials, epoxies, extrusion, injection molding, sheet forming, reinforced plastics, compression molding, foams, mold design, plastic tooling, automotive applications, packaging, test methods, and rheology.

The book is 5½ x 8½ inches in size and 2½ inches thick. It contains many tables, charts, and photographs.

To obtain "Technical Papers from 14th Technical Conference, Vol IV, 1958" remit $7.50 ($5.00 *to SPE members) to Executive Offices, Society of Plastics Engineers, Inc.,* 34 *E. Putnam Ave., Greenwich, Connecticut.*

Catalysis in Practice

This 154-page book consists of seven papers originally presented in April 1957 at a symposium sponsored jointly by the Philadelphia-Wilmington Section of the American Institute of Chemical Engineers and the School of Chemical Engineering of the University of Pennsylvania.

Edited by C. H. Collier, of E. I. du Pont de Nemours & Co., Inc., the book includes chapters on catalyst choice, commercial preparation, fixed-bed systems, moving-bed processes, economics, operating problems in catalytic processing, and an appraisal of trends and prospects in catalysis.

Illustrated with tables, charts, and graphs, the book contains the viewpoints of ten leading practitioners in the chemical process industries. With even greater accomplishments forecast for catalysis, this book should be a must for all engineers interested in the field.

To obtain "Catalysis in Practice" remit $3.95 *direct to Reinhold Publishing Corporation,* 430 *Park Avenue, New York* 22, *New York.*

Top Management Decision Simulation

Aimed primarily at management personnel, this 126-page book presents a new approach to developing the skill of sound decision making. It describes a training method known as top management decision simulation.

The technique is patterned after the war games conducted by the armed forces. Using an electronic computer and new problem-solving methods, the exercise provides realistic conditions under which a few hours of intensive decision-making simulates years of actual business experience.

The book describes the game as it is actually played at the AMA Academy of Advanced Management at Saranac Lake, N. Y.

The development of the technique is discussed, including the initial aproach to the basic pattern, major difficulties of construction, and rules and procedures. Also included is a discussion on the use of the system as a valuable tool for management experimentation.

The book is amply illustrated with charts, graphs, photos, and drawings. Bibli-

To page 209

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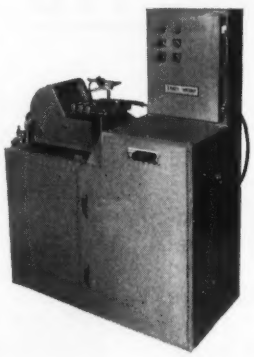

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Keep them handy for use in making quick calculations in the plant or office.

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So —

be sure not to miss this month's "Data" Section. It begins on page 69.

For more information on product at left, specify 5305 see information request blank opposite last page.

From page 207

ography at end of book lists over 60 references on management- and decision-training reading.

To obtain "Top Management Decision Simulation" remit $4.50 (AMA members $3.00) direct to the American Management Association, 1515 Broadway, Times Square, New York 36, New York.

Concise Guide to Plastics

A general discussion of the commercial plastics available today is given in this 318-page guide, by H. R. Simonds.

Individual chapters are devoted to type and form (fillers, adhesives, plasticizers, etc.) of common plastics, production and price figures, applications of each material, plastic-forming processes, and a prediction as to the future of each plastic.

In addition, three chapters supply tabular details on how each plastic compares in major physical properties, a brief description of 43 of the most important US raw plastic manufacturers, and a detailed trade name index.

The book gives the impression of being best suited for a college text.

To obtain "Concise Guide to Plastics" remit $6.95 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, New York.

Technical Report Writing

In "Technical Report Writing," James W. Souther turns the spotlight of scientific procedure on the subject of preparing industrial reports. Cutting through the usual approach to the subject wherein "books and courses in technical writing too often reveal their origin in traditional composition courses", he uses a design approach. The principles of engineering design, translated to the terms of

To page 211

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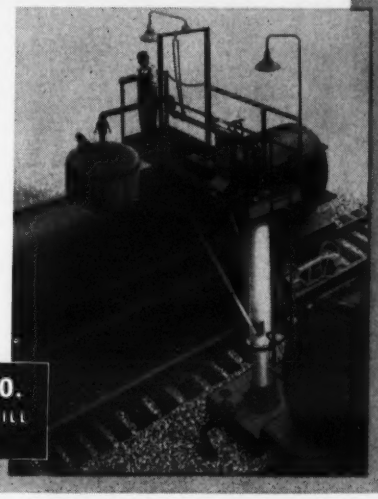

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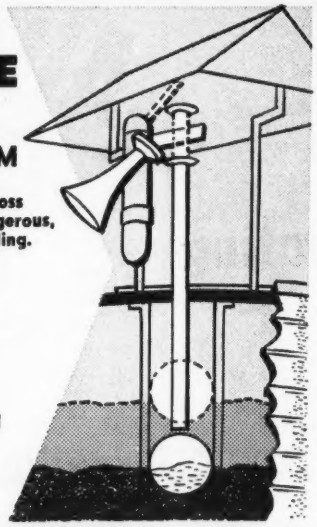

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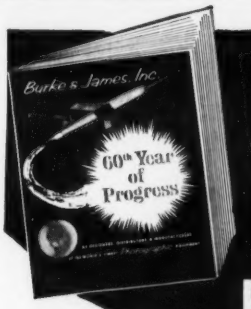

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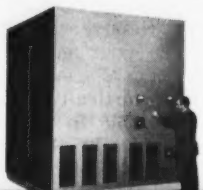

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From page 209

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To obtain "Technical Report Writing", remit $2.95 direct to John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, New York.

Check 5312 opposite last page.

Sourcebook on Atomic Energy

This is the second edition of a book that has gained acceptance as being the standard sourcebook on atomic energy today. The AEC, at the request of the American Textbook Publishers Institute, sponsored the first edition, which was published in 1950. The book obtained worldwide acceptance and has been translated into several different languages.

Written by Dr. Samuel Glasstone, noted educator and scientist, the new edition has again been prepared under the auspices of the AEC and has been enlarged and revised to include the important advances that have been made

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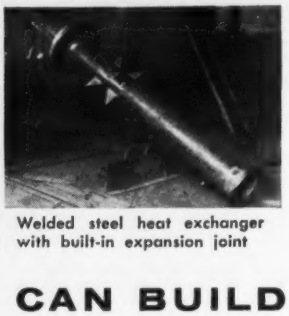

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Simply written so that people from all walks of life can understand it, the book is a valuable reference for every plant, laboratory, school, or home library.

To obtain "Sourcebook on Atomic Energy", remit $4.40 *direct to D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, New Jersey.*

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Textile Chemicals and Auxiliaries
2nd Edition

Editors Henry C. Speel and Eugene W. K. Schwartz have brought together nineteen authorities (besides themselves) in the textile processing field, and in 546 pages they describe textile fibers and finishing processes, and the raw materials used in fabric processing.

The first eight chapters cover physical and chemical nature of fibers, chemical aspects of textile dyeing and printing, textile finishing, coated fabrics, felts and nonwoven fabrics, fabric stabilization, technology of pigment application, and preparation of fibers and fabrics.

The remaining twelve chapters cover raw materials from water to mothproofing agents. Six of these chapters are devoted to the various surface-active agents. Trade names, bibliographies, and marketing data are replete in this text.

To obtain "Textile Chemicals and Auxiliaries, 2nd Edition" remit $13.50 *direct to Reinhold Publishing Corp., 430 Park Ave. New York 22, N.Y.*

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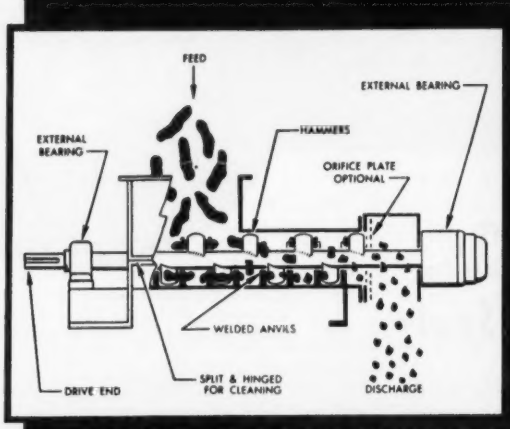

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new literature

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Computer remedies

Homespun remedies for electronic computer programmer's ills are published monthly by manufacturer. Contents of publication include programs, flow charts and coding sheets, and even tips on use of symbols and similar standardized procedures. "The Compleat Programmer" — Electrodata Div. of Burroughs Corporation, 460 Sierra Madre Villa, Pasadena, Calif.

Check 5321 opposite last page.

For pumping abrasives

Illustrated bulletin of four pages describes manufacturer's latest addition to sump pump line. Bul 757 — The Allen-Sherman-Hoff Pump Co,. 259 East Lancaster Ave., Wynnewood, Pa.

Check 5322 opposite last page.

Describes bagging scale

High-speed gross bagging scale with automatic or semi-automatic delivery is described in manufacturer's data sheet. Installation dimensions and bagging specifications are included. Data Sheet 5701—Richardson Scale Co., Van Houten Ave., Clifton, N. J.

Check 5323 opposite last page.

Gifts of the firebird

According to manufacturer, his electrochemicals, born in flames like the legendary Phoenix, gain new power to perform new wonders. Booklet provides valuable data on zirconium compounds being supplied to industry as oxides, carbides, borides, and nitrides, as well as calcium zirconate. Electrochemicals booklet — Electro-Chemical Div., Norton Company, 884 New Bond St., Worcester 6, Mass.

Check 5029 opposite last page.

Industrial-truck electricity

To prove that battery power for industrial trucks is simple and easy to understand, manufacturer offers two-page short course in fundamentals. "Simplified Electricity for Electric Industrial Trucks" — Exide Industrial Div., The Electric Storage Battery Co., Box 8109, Philadelphia, Pa.

Check 5324 opposite last page.

Thermal conductivity

Operation, features, specifications, typical applications of instrument for measurement of thermal conductivity of gas are presented in four-page Bul 200 — Analytic Systems Company, 980 North Fair Oaks Ave., Pasadena, Calif.

Check 5325 opposite last page.

Dust, product collector

Dimensions and specifications of dust and products collector designed for all applications where air is used to handle material are contained in four-page bulletin. Features and operation of unit are discussed. Bul 150-A — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 5326 opposite last page.

Inside story

Manufacturer's bulletin gives complete specifications of Pyrex brand sight glasses which enable you to see what goes on inside your equipment. Mounting recommendations for glass that can withstand temperatures up to 500°F and pressures up to 300 psi are included. Bul EB-20 — Corning Glass Works, 15-5 Crystal St., Corning, N. Y.

Check 4952 opposite last page.

Tells story of Dynel

How the fiber is made, its properties, use, and fabric care are included in 16-page illustrated booklet designed for interested professionals in consumer and industrial fields. "The story of Dynel" — Union Carbide Chemicals Co., Div. of Union Carbide Corp., 100 East 42nd St., New York 17, New York.

Check 5327 opposite last page.

Lab weight bul

Construction and tolerance details for laboratory weights are reviewed in manufacturer's 24-page catalog. Booklet concerns classification of laboratory standards and working weights. Bul W-57 — Henry Troemner, Inc., 22nd and Master Sts., Philadelphia 21, Pennsylvania.

Check 5328 opposite last page.

Nuclear conference data

The third and final volume of "Proceedings of the 1957 Nuclear Engineering and Science Conference" is now available. Called "Hot Laboratory Operation and Equipment," book contains papers delivered at the fifth Hot Laboratories and Equipment Conference which was held as part of the Nuclear Congress. To obtain the three volumes of Nuclear Conference proceedings, remit $45 ($17.50 each) direct to American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y.

REASONS WHY ENGINEERS CHOOSE "BUFFALO" PUMPS

Let's think of pumps in terms of hard service on the job — and the reasons why "Buffalo" Pumps deliver maximum efficiency with minimum maintenance for years and years of such service.
Note these rugged construction features of "Buffalo" Full Ball Bearing Single Suction Pumps:

1. Sturdy cast iron bearing stand and casing mounting ring. These components are interchangeable on all size pumps up to and including No. 3. Engineers like this feature, since they often effect economies by standardizing on one line of pumps with varying capacities.

2. Easily-renewable bronze wearing rings protect casing from wear.

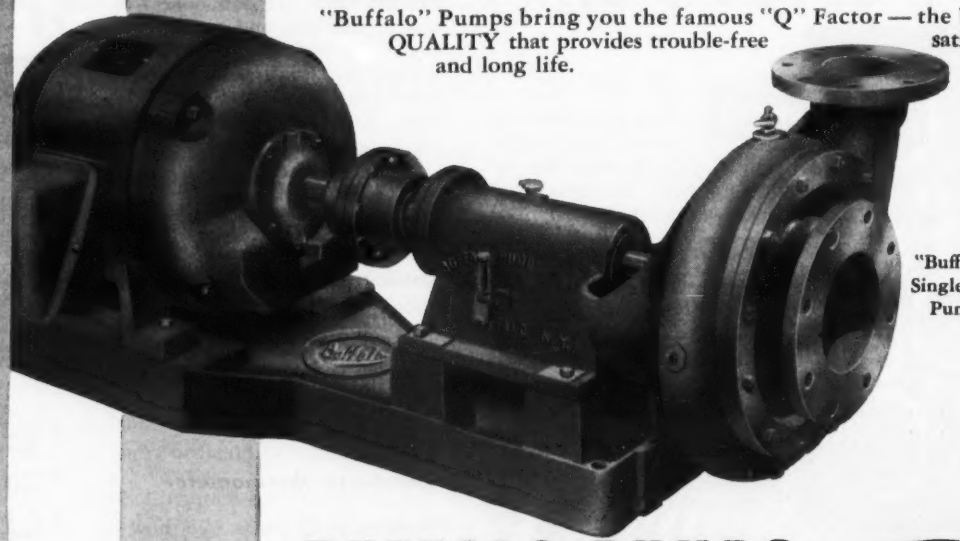
3. High efficiency bronze impeller. Enclosed type has liberal openings to handle abrasive solids. Open type, without wearing rings, is optional.

4. Oversize ball bearings running in oil provide rigid support for shaft and impeller.

Add to these the heavy cast iron frame, oversize shaft, extra-deep stuffing box, long-wearing gland with packing furnished — and you have a total of eight superior engineering features built into every "Buffalo" Single Suction Pump.

These plus many more high quality "Buffalo" components provide the sound reasons why engineers look to "Buffalo" Pumps for a long life of efficient, dependable, economical service. For your next heavy-duty pumping job, contact your nearby "Buffalo" Engineering Representative. He will be glad to work with you and help in every way. Or, write us direct for Bulletin 976-E.

"Buffalo" Pumps bring you the famous "Q" Factor — the built-in QUALITY that provides trouble-free satisfaction and long life.



"Buffalo" Single Suction Pump

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DIVISION OF BUFFALO FORGE CO., BUFFALO, N. Y.
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A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

Check 5329 opposite last page

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Stainless Steel Tube Fittings

Flareless foolproof assembly makes a butt joint

- Corrosion Resistant — Type 316 Stainless
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- Meets J.I.C. and A.S.M.E. standards; listed by UL
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The most important advance in tube fittings in 20 years!

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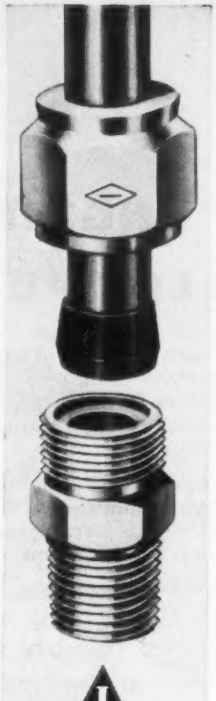

IMPERIAL

Industry's most complete line of tube fittings and tubing tools

Emblem of Quality

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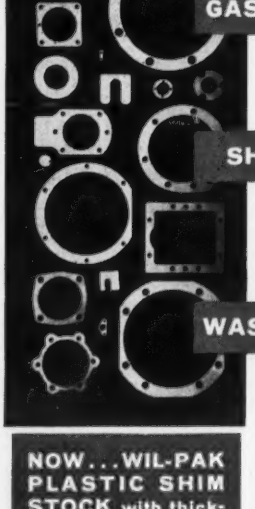


With more than 50 years' accumulation of dies, chances are we can furnish the gaskets, shims, or washers you need *. . . without a die charge.* This can cut your cost and speed delivery—whether you need just a few items or large quantities. Gaskets, shims, washers or special stampings are available in metallic, non-metallic and plastics to meet your production requirements.

NOW...WIL-PAK PLASTIC SHIM STOCK with thickness identified by color and gauge number. Write for Bulletin No. 570.

Write for Catalog and prices

CHICAGO-WILCOX Mfg. Co.
7717 South Avalon Avenue
Chicago 19, Illinois

Check 5331 opposite last page

NEW LITERATURE

Details steam trap

How manufacturer's open float steam trap works to remove condensate and keep steam lines hot and dry is explained in six-page folder. Tables and instructions for selecting traps for any condensate discharge condition are included. Bul Ad-2261 — Crane Company, 836 S. Michigan Ave., Chicago 5, Ill.

Check 5332 opposite last page.

For combating fires

Portable fire extinguishers, built-in carbon dioxide extinguishing systems, smoke detecting systems, and rate-of-temperature-rise fire detecting systems are described and illustrated in 12-page Cat P-40 — Walter Kidde & Company, Inc., Dept. "A", Main Street, Belleville 9, N. J.

Check 5333 opposite last page.

Separator catalog

Manufacturer's 30" vibrating screen separators are described and illustrated in four-page catalog which presents operating, application, and specification data. Bul S574-1 — Separator Div., Southwestern Engineering Co., 4800 Santa Fe Ave., Los Angeles 58, Calif.

Check 5334 opposite last page.

Chemicals, oils, colors

Catalog of over 1500 essential oils, aromatic chemicals, and certified colors has 36 pages. — Dodge & Olcott, Inc., 180 Varick St., New York 14, N.Y.

Check 5335 opposite last page.

Resistance thermometer

Booklet of 15 pages tells how to use platinum resistance thermometers in temperature measurement, telemetry, and control. "How to use Platinum Resistance Thermometers . . ." — Trans-Sonics, Inc., Burlington, Mass.

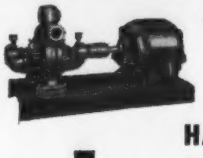
Check 5336 opposite last page.

Superb Performers

AURORA APCO *Turbine-Type*

AURORA *Always* PUMPS

AURORA® *Centrifugal*



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GRAPHIC SYSTEMS, 55 West 42nd St., New York 36, N. Y.

Check 5338 opposite last page

NEW LITERATURE

Radiological service

Radiological health and safety consulting service is described in eight-page bulletin. Service is intended to meet needs of handlers and users of radioactive materials when facilities or trained personnel to adequately monitor operations are not available. Radiological health, safety bul — Nuclear Div., Combustion Engineering, Inc., 200 Madison Ave., New York 16, N. Y.

Check 5339 opposite last page.

Describes colorimeter

Photographs and detailed drawings in four-page bulletin illustrate and describe instruments that continuously measure color intensity, turbidity, or chemical concentration in wide variety of process streams. Bul 4000 — Process Instruments Div., Beckman Instruments Inc., 2500 Fullerton Rd., Fullerton, California.

Check 5340 opposite last page.

Material handling facts

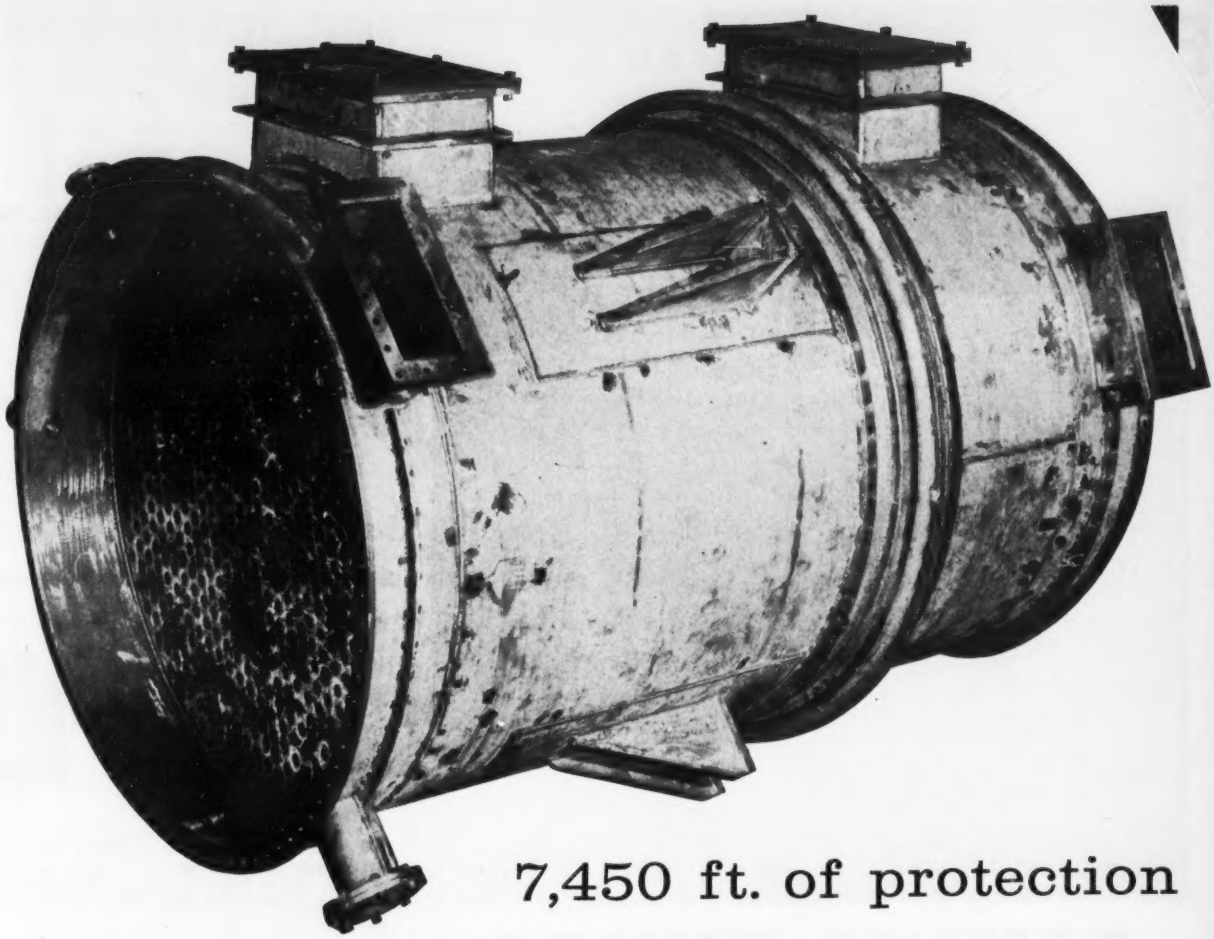
If you want to reduce man hour costs and improve overall plant efficiency, this folder, which includes data on some of the latest accessories available for speeding material handling operations and specific solutions to handling problems, will be of interest to you. "Pertinent Facts on Materials Handling"—Towmotor Corporation, 1226 E. 152nd St., Cleveland 10, Ohio.

Check 5341 opposite last page.

Tanks and linings

Manufacturer's data files provide information on corrosion-resistant and anti-contamination lining or coating process, as well as field fabrication and erection of tanks. Data Files "L" (linings) and "B" (tank fabrication) — The Bishopric Products Co., 4413 Este Ave., Cincinnati 32, O.

Check 5342 opposite last page.



7,450 ft. of protection from 1000°F chemicals provided by Carpenter Welded Stainless Tubing

• One of the largest ever built, this vertical heat exchanger is used by a leading chemical company as a chemical converter operating at temperatures up to 1000°F. It measures 7½ ft. in diameter by 10 ft. high. The tubes, tube sheets and bonnets are all of Type 321 stainless steel. They convey a highly corrosive chemical catalyst.

The consistent quality and greater uniformity of Carpenter Stainless Tubing are influential factors in its selection for more and more critical applications.

Carpenter delivers these advantages plus the biggest extra of all . . . lower initial cost.

All 40 types of Carpenter Stainless Tubing can deliver these benefits. Contact your local distributor for some solid "how" and "why" information or write for TD 120, Carpenter's newest Selecting and Buying Guide. The Carpenter Steel Company, Alloy Tube Division, Union, N.J.

MEMBER

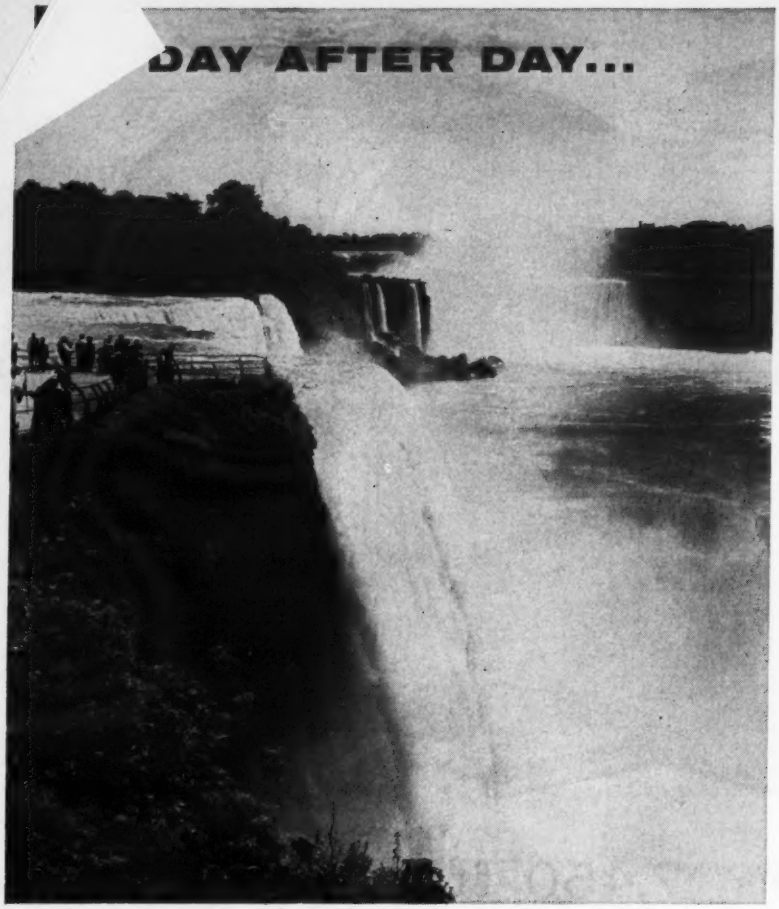
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe

Check 5343 opposite last page



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proven performance in industry

Millions of gallons of water cascade over Niagara Falls daily . . . it's a tremendous sight. In industry too, millions of gallons of diversified liquids are pumped every day by Deming Pumps.

Dependable Deming Pumps are recognized throughout industry for their proven reliability and performance.

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BOOST STEAM SYSTEM EFFICIENCY! SPECIFY . . . BUY

STRONG

Hydro-Flex STEAM TRAPS

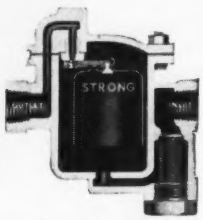
STRONG Hydro-Flex STEAM TRAPS provide all these advantages:

GREATER CAPACITY . . . thru STRONG "lever-lift" trap action
BETTER HEATING . . . thru rapid elimination of air and condensate
HIGHER EFFICIENCY . . . even under very light loads
LONGER LIFE . . . thru extra-heavy cast or forged construction
LESS WEAR . . . only two parts move — no pins on larger traps
INTERCHANGEABLE INTERNAL PARTS . . . made of tough stainless steel

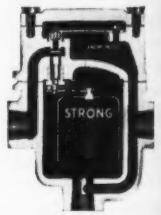
STRONG'S complete line contains a trap for every steam system: 0 to 2500 psi, 0 to 1100°F, 0 to 100,000 lbs/hour.

Horizontal, in-line traps:

140, 141, 142, 143, 144 (semi-steel): pressure-temperature limit — 250 psi at 450°F; capacities to 11,500 lbs/hour



140S, 141S, 142S (semi-steel): same as 140-142, with a built-in strainer for removing foreign matter.



140T, 141T, 142T (semi-steel): same as 140-142, with a high capacity thermal vent for faster heating

Bottom inlet, top outlet traps:

42, 43, 44, 45, 46 (semi-steel): pressure-temperature limit — 250 psi at 450°F; capacities to 42,800 lbs/hour

643, 644, 645, 646 (cast steel): pressure-temperature limit — 600 psi at 800°F; capacities to 42,800 lbs/hour

1543, 1544, 1545, 1546 (forged SAE 4130 Chrome-Moly Steel): pressure-temperature limit — 1500 psi at 950°F; capacities to 42,800 lbs/hour

642 (forged steel): pressure-temperature limit — 400 psi at 850°F; capacities to 2665 lbs/hour (not illustrated)

2544, 2545, 2546 (forged ASTM A335-P22 Chrome-Moly Steel): pressure-temperature limit — 2500 psi at 1100°F; capacities to 42,800 lbs/hour (not illustrated)

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air traps • strainers • vacuum or pumping traps
continuous blowdown valves • separators • engine stops • F and T traps • reducing valves

Check 5345 opposite last page

Plastic pipe fittings

Information on lightweight unplasticized polyvinyl chloride fittings, for use with Schedules A and 40 UPVC pipe, is contained in manufacturer's Bul TTP-119R — Tube Turns Plastics Inc., Dept. CP-5, 2929 Magazine St., Louisville 11, Ky.

Check 5253 opposite last page.

For sealing requirements

Specifications of manufacturer's end face seals to meet widest possible range of sealing requirements are contained in six-page bulletin which includes size range table for both long and short series. Bul EF-100 — Chicago Rawhide Manufacturing Company, 1301 Elston Ave., Chicago 22, Ill.

Check 5346 opposite last page.

Silicone-coated papers

Properties and performance of papers treated with silicone coatings are discussed. Four-page Bulletin 8-601 — Dow Corning Corp., Midland, Mich.

Check 5347 opposite last page.

Sewage disposal system

Bulletin of 32 pages on flash drying and incineration system briefly outlines problem of sewage sludge disposal. Photographs and four-color diagrams explain how system works. Bul FD-57 — Raymond Div., Combustion Engineering, Inc., 1319 North Branch St., Chicago, Ill.

Check 5348 opposite last page.

Temperature control

Bulletin of six pages shows how to select size, proper body material, valve trim, thermal systems, and order temperature control valves. Bul 655 — Jordan Industrial Sales Div. of OPW Corp., 6013 Wiehe Rd., Cincinnati 13, Ohio.

Check 5349 opposite last page.

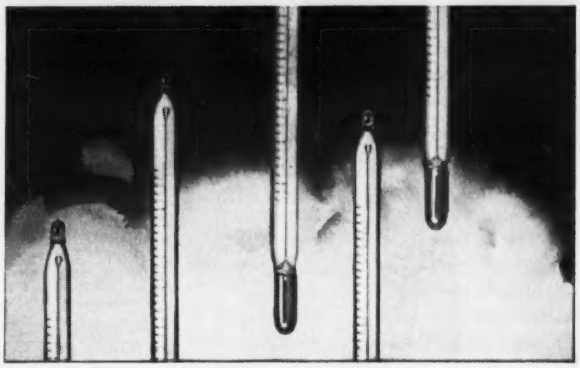
News and Notes on...

Good Packing Practice

JOHNS-MANVILLE JM PRODUCTS

Maintenance and Design Hints from Johns-Manville Packings and Textiles Dept.

Subject of the month: High Operating Temperatures



Question:

What sealing materials are currently available that will match conditions brought about by higher and higher operating temperatures?

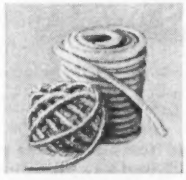
Condition 1

FOR LASTING VALVE SEALS AGAINST SUPERHEATED STEAM AND DRY GASES

Designed to meet today's demand for a packing that will maintain a tight seal against steam and dry gases on valves working at line temperatures up to 1200F, J-M High-Temperature Valve Stem Packing, Style 397, offers the three-way protection of a heat-resistant plastic core, asbestos yarn, and Inconel wire reinforcement. For lasting protection of valve stems during storage, this efficient packing is now available with J-M No. 9 corrosion inhibitor.

Condition 2

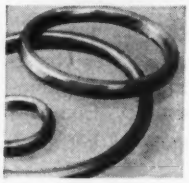
FOR UTILITY SEALING IN GENERAL APPLICATIONS REQUIRING HEAT AND FLAME RESISTANCE



Wherever your operation calls for a utility gasketing material that withstands both heat and flame, specify J-M Asbestos Rope, Style 4200. Made of 99% pure asbestos, this material can take temperatures far in excess of other grades of rope. You'll find it a handy, reliable gasket for sealing joints between furnace doors and brickwork, boiler expansion joints, blast furnace connections, ingot moulds, and countless other uses. Ask for information about J-M Style 4200 Asbestos Rope.

Condition 3

FOR FLANGES WORKING AT TEMPERATURES TO 1600F AND HIGHER



Elevated temperatures are efficiently sealed using J-M Goetze V-Tite Gaskets. Used in flanges grooved for ring joint gaskets. Materials are available for service ranging upwards of 1600F. Controlled hardening assures correct flow of material at low bolt stress. Temperature range —320F to +1600F and higher.

Condition 4

FOR PACKING PROBLEMS IN ANY TEMPERATURE RANGE

Your Johns-Manville field representative is a trained specialist in packing problems of all types. He's located near you, to help out whenever you need specialized packing information. For information on new packings and gaskets—for engineering and design advice—for tips on more efficient, more economical packing techniques—your Johns-Manville representative is a good man to know.

For information on any Johns-Manville Packings and Gaskets, write Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario.

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Check 5350 opposite last page

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THE CENTRIFUGAL WITH FULL AUTOMATION

Bottom Discharge Tri-Point Centrifugal

Bottom Discharge →

CUT PRODUCTION COSTS IN HALF — The Fletcher Tornado needs no operators. It's fully automatic, gives you 24-hour production. You're certain of quality control of your product because of the uniform load and the unvarying consistency. Compare these features.

Uni-Construction—Entire centrifugal—basket, curb, drive and accessories oscillate as a unit.

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F/M variable drive • Zero to maximum RPM

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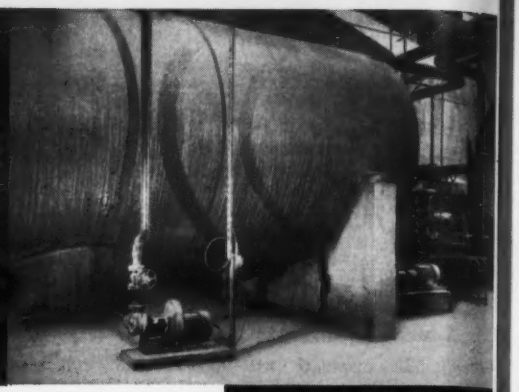
Check 5351 opposite last page

VIKINGS PUMP THICK SOAP



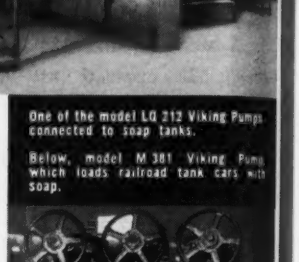
...for St. Regis Paper Mill

In their newly-enlarged Jacksonville, Florida, mill, St. Regis Paper Company installed the most modern, efficient equipment available. Included are three heavy-duty Viking Pumps to handle black liquor soap skimmings. This soap is thick and viscous, yet only two model LQ212 Vikings pump 25,000 gallons a day into two separating tanks. And one model M381 Viking loads 12,000-gallon tank cars in approximately one and a half hours. You see, Vikings are built for rugged pumping.

If you have to move thick liquids, we'd like to help. Write now for bulletin Section CCC.

One of the model LQ 212 Viking Pumps connected to soap tanks.

Below, model M 381 Viking Pump which loads railroad tank cars with soap.



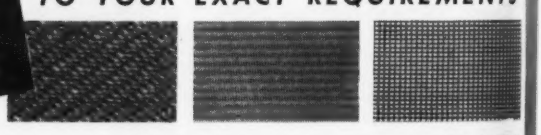
VIKING PUMP COMPANY
Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" pumps
See Our Unit in Chemical Engineering Catalog.

Check 5352 opposite last page

Wire Cloth-Filter Cloth

TO YOUR EXACT REQUIREMENTS

in Rolls or Cut Pieces



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NEVA-CLOG perforated metal sheet filter medium—strong, rigid, smooth, non-clogging.
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MICRO-MESH high shute count filter cloth up to 1500 wires/in.—retention to 10 microns.

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"RIM-LOK" leaves for stationary leaf batch pressure filters, vertical or horizontal shell.
Filter leaves (bare or covered) for all other standard pressure filters.
Custom-made leaves and elements to your special design.
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Inquiries invited. Write for Catalog

MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE • NEW YORK 59, N. Y.

Check 5353 opposite last page

Nuclear heat transfer

Report of 34 pages presents heat transfer studies on the use of biphenyl and biphenyl polymers as coolants and moderators for nuclear reactors. Studies are based on direct determination of film coefficients, overall heat transfer coefficients, or both, on an electrically heated horizontal tube. To obtain PB 131214, "Heat-Transfer Studies on a Forced Convection Loop with Biphenyl and Biphenyl Polymers", remit $1.00 direct to Office of Technical Services, US Dept. of Commerce, Washington 25, D. C.

Prevent metal corrosion

Two reference file sheets provide metal corrosion prevention information concerning cathodic protection and erosion-corrosion. Reference Files 1-12.1.12 and 1-12.1.14 — Chemical Plants Div., Blaw-Knox Company, Pittsburgh 30, Pennsylvania.

Check 5354 opposite last page.

Quercetin

Fourteen-sheet report gives properties, uses of quercetin, $C_{15}H_{10}O_7$, produced from Douglas fir bark. Over 50 references are given. Uses: Dyeing, flavors, pharmaceuticals, as intermediate. "Report 05-0401" — Central Development Dept., Weyerhaeuser Timber Co., Longview, Wash.

Check 5355 opposite last page.

Controllers

Complete line of indicating controllers for automatic control of pressure or temperature; transmitters for pressure or temperature indication; receiver gages in various designs, ranges, and degrees of accuracy and sensitivity are described in 16-page catalog. Cat 510 — United States Gauge Division of American Machine and Metals, Inc., Sellersville, Pa.

Check 5356 opposite last page.

Trapping Standardization

. . . steam trap standardization plus standardized hook-ups spell lower maintenance costs

An important weapon in the fight against rising maintenance costs is standardization. It can reduce the variety of maintenance problems and simplify those which remain.

Since we specialize in steam traps we'd like to offer some suggestions for a trapping standardization program. Such a program involves standardization on one make of trap and standardization of hook-ups.

Trap Standardization

The advantages of standardizing on a single make of trap are important and can make a big difference in the cost and ease of repairs because—

1. You can carry a more complete stock of repair parts with a smaller inventory.

2. Maintenance personnel has the opportunity to become expert on one make rather than be "jacks of all traps."

3. As an exclusive user of one make of traps you become a preferred customer of your trap representative and can be sure of getting the best possible service.

4. You can enjoy the advantages of standardized hook-ups.

Standardized Hook-ups

Standardized hook-ups facilitate and reduce the cost of both original installation and maintenance. By adopting standards for the dimensions of all fittings, including nipples, each hook-up for a given size of trap is identical and can be fabricated in the pipe shop.

Unions should be used so that when a trap needs repair, the unions can be uncoupled, the trap lifted from the line and a spare carrying identical length nipples and half unions slipped into place. In as little as a minute or two a faulty trap can be replaced. The faulty trap can go back to the storeroom for repair when convenient and then be put into stock as a spare.

Figure 1 shows a typical standardized hook-up used by a major chemical manufacturer. Note how

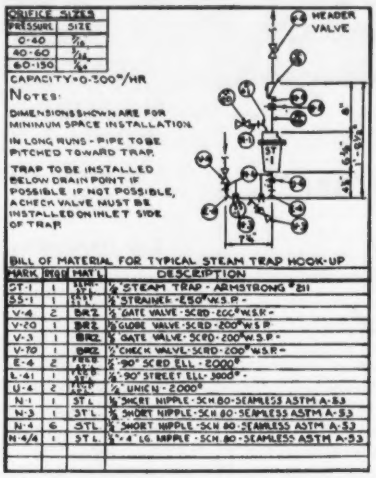


Fig. 1—Typical standardized installation hook-up used by a leading chemical manufacturer.

the hook-up provides the following advantages:

1. Test valve in trap cap permits fast, easy checking of trap operation.
2. Strainer ahead of trap protects it against dirt and scale.
3. Blowdown valve in strainer provides easy cleaning.
4. Check valve in discharge line isolates trap when test valve is opened.
5. Shut-off valves and unions ahead of and following trap permit removal of entire trap from line.

Another important consideration for getting the most from a standardization program is accessibility of the traps. Insofar as is possible, traps should be located so that they are convenient for inspection. The easier it is to locate and get at a trap, the less likelihood that it will be overlooked.

Fig. 2—Armstrong traps have only two moving parts—the lever assembly and the bucket. Nothing much to go wrong here.

What Make of Trap? (This is the Commercial)

Obviously, a trap standardization program shows the best results when the make of trap selected is the one that gives the best service. Naturally, we think the make should be Armstrong and fortunately a lot of trap users agree. Here are some of the advantages of standardizing on Armstrong that have been pointed out by these users:

1. *Armstrong traps work.* They don't leak steam and they do discharge condensate and air as fast as they reach the trap. And they work with any return system.

2. *Armstrong traps aren't "prima donnas."* They need no special care or coddling. Valve and seat are hardened chrome steel. Lever assembly and bucket are stainless steel and these are the only moving parts.

3. *Armstrong traps aren't "orphans."* You can *always* get parts and service from nearby Factory Representatives and stocking distributors.

4. *Armstrong traps are guaranteed.* If you're not *completely* satisfied you can return the traps for refund of purchase price.

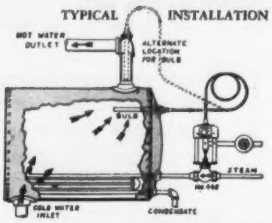
More Information

The 44-page Steam Trap Book (free on request) gives a lot more facts on trap selection and installation. Call your local Armstrong Representative or write **Armstrong Machine Works, 8805 Maple St., Three Rivers, Michigan.**

ARMSTRONG STEAM TRAPS

Check 5357 opposite last page

If you need to control
tank temperature



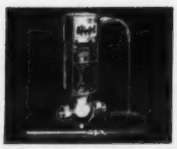
call for a valve from

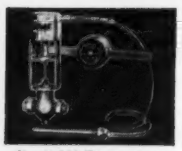
Klipfel

Klipfel Temperature Regulator Valves operate without auxiliary power. Pressure changes in a temperature-sensitive bulb are transmitted to a seamless, 2-ply, extra-strong bellows which opens or closes the valve smoothly to maintain desired temperature.

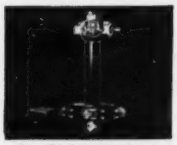
Wide Temperature Range **Indestructible Yoke**
Direct or reverse action **Manual override**
Single, double or three-way bodies

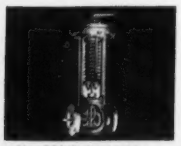
Call your supply house or write for Bulletin 354-A.


No. K-449 Temperature Regulator Valve


No. K-348 Temperature Regulator Valve

AIR MAIL
Most items shipped within 24 hours after order is received

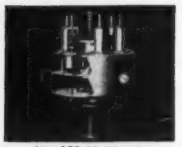

No. 410 Reducing Valve


No. 300 Reducing Valve

No. 135 Relief Valve

No. 7 Float Valve

No. 27 Float Valve


No. 135 Multiport Relief Valve

HAMILTON • OHIO **Klipfel** VALVES INC.

Automatic Temperature-and-Pressure-Regulating Valves Since 1902

Float Valves • Temperature Regulators • Back Pressure Valves • Reducing Valves

A DIVISION OF THE HAMILTON-THOMAS CORPORATION

Check 5358 opposite last page

NEW LITERATURE

High-vacuum products

Features, construction, and specifications for high-vacuum valves, baffles, and traps are presented in 28-page bulletin well illustrated with photographs and drawings of equipment. Bul 10-1 — Rochester Div., Consolidated Electrodynamics Corporation, Rochester 3, N. Y.

Check 5359 opposite last page.

Car unloading

How manufacturer's car shaker for unloading hopper-bottom cars saves time, labor, and money is described and illustrated in six-page bulletin. Car shaker bul — National Conveyor & Supply Co., 350 N. Harding Ave., Chicago 24, Ill.

Check 5360 opposite last page.

End-point detection

Booklet of 30 pages contains reprint on nature and methods of end-point detection. A bibliography of five pages is included. "The EDTA Titration" — J. T. Baker Chemical Co., Phillipsburg, N. J.

Check 5361 opposite last page.

'Soft touch' pilot light

Manufacturer describes and points out features of "feather-touch" push-to-test pilot light that is completely oil-tight, even when depressed. Bul 9001-T — Square D. Co., 4041 North Richards St., Milwaukee 12, Wis.

Check 5128 opposite last page.

Copper sulfate

Copper sulfate production in a modern plant is described in detail in 10-page brochure. Statistics on industrial agriculture, and export uses are included. "Copper Sulfate" — Republic Chemical Corp., 94 Beekman St., New York 38, New York.

Check 5362 opposite last page.

PROPELLAIR

...built to solve your "heavy duty" ventilating problems

...mount in any position

Heavy duty Propellair Type "CD" fans are designed for versatility and rugged duty. They can be mounted in side walls, roof ventilators, hoods, ducts and machinery in any position you require. They are ideal for "tough" ventilating jobs like removing heat, moisture, smoke and dust laden air. You get greater efficiency and quieter operation, because the exclusive venturi entrance ring prevents wasteful recirculation. The rigid, cast aluminum, precision balanced air-foil propeller runs quieter and retains its clean aerodynamic characteristics at all operating pressures. Powered by dependable Robbins & Myers Motors of any design you need, they are covered by a single name-plate guarantee. Available in sizes from 12" to 60" for from 1020 to 85000 CFM air delivery. Let Propellair engineers survey your needs and recommend the correct ventilating equipment.

WRITE FOR BULLETIN NO. 690-C

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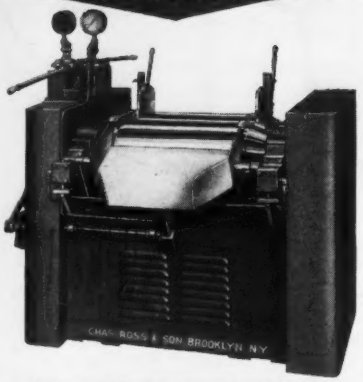
DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO
Certified Ratings
AMCA

MAN COOLER SKY-BLAST VANEAXIAL TUBEAXIAL EXTENDED SHAFT

MOVING AIR IS OUR BUSINESS

Check 5363 opposite last page

NEW Ross HIGH SPEED
THREE ROLL MILLS WITH—
ONE POINT HYDRAULIC
ROLL ADJUSTMENT



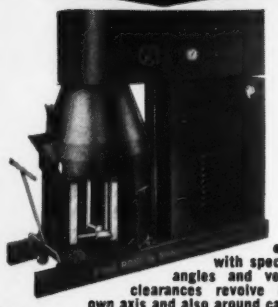
• Pressure indicating gauges provide greater ease in properly setting rolls, and less skill or experience is required by operator.

• Roll pressure settings can be recorded for exact reproduction of material assuring standardization of product.

• Special equalizers assure positive parallelism of roll faces at all times for uniform dispersions and minimum maintenance costs.

• Mills have quick roll release with safety overload feature, and are convertible for either fixed or floating center roll operation. 2½x5, 4½x10, 6x14, 9x24, 12x30, 14x32, and 16x40" sizes.

Production size dispersion type
Change Can Mixers with—
DOUBLE PLANETARY
stirrer action.



• Stirrers with special blade angles and very close clearances revolve on their own axis and also around can, developing 12 intense compressive and shearing actions with each revolution to break down and disperse agglomerates.

• Variable speed for infinite range of stirrer speed control. • Simplified vertical hydraulic lift for greatest ease in cleaning down stirrers. • Non-revolving can is completely enclosed during mixing for safety and to reduce solvent loss. Cans can be jacketed or fitted with slide gate when required. Cans are easily positioned or removed from Mixer. • Extra heavy construction and standard type motor eliminate costly downtime. Oversized motor drives can be provided for kneading and mixing extremely heavy materials. 1, 2, 3, 4, 6, 8, 12, 25, 50, 65, 85, 125 and 150 gallon sizes.

Area of can contacted by stirrers during only one revolution of stirrers around can (2 seconds). Position of stirrers advances 4½° with each successive revolution to sweep entire area and all points on sides of can. Stirrers overlap each other as well as center of can.

Write for further information!
CHARLES ROSS & SON COMPANY, INC.
154 Classon Avenue
Brooklyn 5, N. Y., U. S. A.

Check 5364 opposite last page

NEW LITERATURE

Compacting mill info

Designed to provide low-cost, mechanical means for converting or upgrading particle size, and for controlling product density and product solubility factors, manufacturer's compacting mill is described in four-page bulletin. Equipment used with compactor is illustrated. Bul 07B8836 — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 5365 opposite last page.

Rotary car dumper data

Illustrated 16-page bulletin provides data on manufacturer's dumper capable of handling hopper and gondola cars. Bul 957 — Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.

Check 5366 opposite last page.

N_2O in leak detection

Bul of eight pages presents tech data on nitrous oxide's properties when used for leak detection in pressurized systems. Form IA — Ohio Chemical and Surgical Equipment Co., Div. of Air Reduction Co., Inc., 1400 E. Washington Ave., Madison 10, Wis.

Check 5367 opposite last page.

Data on evaporators

Applications of, and pertinent information on, manufacturer's evaporator line are contained in Cat 372 — Buflovak Equipment Div., Blaw-Knox Company, 1645 Fillmore Ave., Buffalo 11, N. Y.

Check 5298 opposite last page.

Fatty acid specs

"Specifications and Characteristics of Fatty Acids" is title of data folder covering complete line of manufacturer's fatty acids. Data folder EM-19 — Dept. 5, Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

Check 5368 opposite last page.

for more accurate chemical feed control at LOWER COST use a...

"Packaged"
NEPTUNE
CHEMICAL FEED UNIT

JUST PIPE-IN . . .
PLUG-IN . . . AND OPERATE!

You'll get positive, accurate proportioning of chemicals when you use a NEPTUNE "packaged" chemical feed unit. That's because tank, agitator and pump are designed and built into one precisely-engineered chemical feed system. In addition to lower first cost and minimum upkeep, longer life is assured by 316 stainless steel piston, valves and ball checks.

- simply designed pump can be regulated easily to proportion exact quantities of chemical continuously
- agitator keeps precipitates from settling, assuring constant solution strength
- Y-type strainer removes harmful solids, prevents pump damage

Tank, agitator and pump are combined in one smooth operating system that precisely proportions anything from treating chemicals, such as calgon, to petroleum distillates.

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PHILADELPHIA 20, PA.
phone: DAvenport 9-4983

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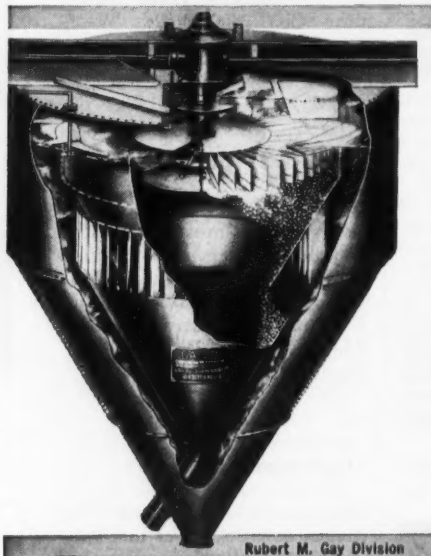
USING SCREEN SEPARATIONS?
NOTHING CLASSIFIES AS
PERFECTLY AS AIR



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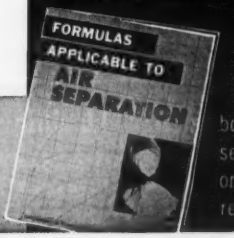
CENTRIFUGAL
AIR
SEPARATORS

Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy-Duty Models.



this helpful booklet sent on request

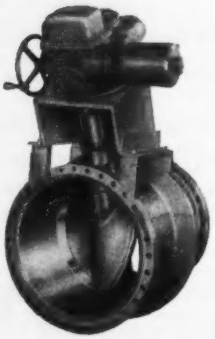
Rubert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 5370 opposite last page

Your plant needs

ROCKWELL VALVES *like these*

"Kwikleen" slide valve for powdered coal, granular materials, flue gases with high solids content, etc.; solids accumulations easily cleaned out by removing bottom plate.



"Stress-seal" butterfly valve for tight shut-off of hot, corrosive or dirty gases to 1300° F. and higher, at 200 p.s.i. Alloy stress band in valve body is inflated by external gas pressure to effect tight seal.

Butterfly valve with simplified bracket and linkage to air operator and valve disc positioner; provides maximum adjustment, minimizes friction, eliminates backlash, chatter and hunting, reduces power requirement in close control applications.

"Slim-Jim" wafer type butterfly valve for low pressure air, gas or liquids; low cost, light, simple, space-saving, easy to install.

What's your valve problem?

W. S. ROCKWELL COMPANY
2208 ELIOT STREET
FAIRFIELD, CONN.

Check 5371 opposite last page

NEW LITERATURE

Handy-design index to ASME code

When is it necessary to stress-relieve a pressure vessel? Where is X-ray inspection of welded seams required? Convenient ASME code index will help engineers answer questions of this type. ASME code index — Downingtown Iron Works, Inc., Dept. C, Downingtown, Pa.

Check 5372 opposite last page.

For severe corrosion

Coal tar-epoxy coating for severe corrosive conditions is described in four-page bulletin. "Sovapon" Bul — Socony Paint Products Company, Metuchen, N. J.

Check 5373 opposite last page.

Steel strapper

By use of schematic drawings, manufacturer's four-page folder describes and illustrates how steel strap feeder answers problem of rapidly and conveniently feeding vertical straps around large packages or skid loads. Model PSF-1 Bul — Signode Steel Strapping Co., 2600 North Western Ave., Chicago 47, Ill.

Check 5374 opposite last page.

Corrosives packing

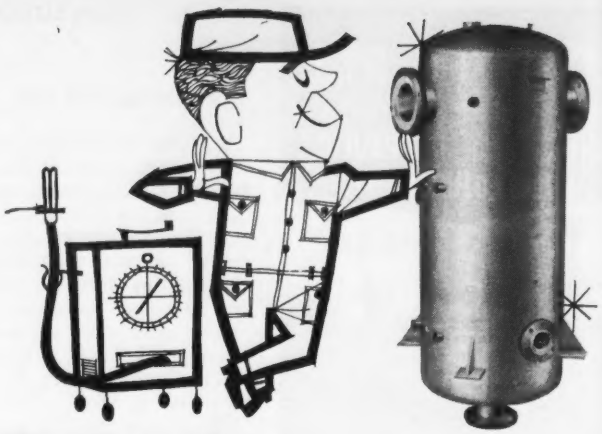
Braided Teflon packings designed to meet any combination of service conditions and requirements are illustrated in Bul P-325 — Crane Packing Co., 6421 Oakton St., Morton Grove, Ill.

Check 5097 opposite last page.

High-speed mixers

Bulletin of four pages illustrates and describes manufacturer's high-speed, vertical, batch and other mixing equipment. Bul 581—Conn & Co., 11 S. Marion St., Warren, Pennsylvania.

Check 5375 opposite last page.



Tanks a lot...

Tanks? We fabricate all kinds, shapes and sizes. Want something agitated? We make agitator tanks. Need something pressurized? We fabricate pressure tanks. Storage? We fabricate tanks for that, too. We make our tanks from your ideas—in stainless steel, monel, nickel, inconel, aluminum or plain steel. Littleford tanks are tailor-made to your specifications. They meet all state and national codes. What's your tank problem? Send it to us for a prompt and practical solution.

LITTLEFORD

Littleford Bros. Inc. 417 E. Pearl Street Cincinnati 2, Ohio

Check 5376 opposite last page

corrosion-resistant

PLASTIC VALVES

by CHEMTROL

for FULL-FLOW, LONGER LIFE *from your* PIPING SYSTEM

Advanced corrosion-service plastic valves of PVC (Polyvinyl Chloride), Type I and Type II; Penton*; Kralastic**; Polypropylene (Pro-fax*); and other polymer materials have lower first, and reduced maintenance costs (up to 80% less over service range). The ONLY complete line—with widest range of types and sizes. 5 year guarantee.

Micro-Meter NEEDLE VALVES

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WRITE FOR COMPLETE DATA, PRICE LIST AND NAME OF NEAREST DEALER, more than 500 across the nation

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Before you buy any feeder read this news from ERIEZ

No other feeder like it! New concepts in design and materials produced this outstanding feeder that provides accurate, controlled feed of bulk materials ranging from ounces to tons per hour—*automatically!* Can be used for numerous operations including: spreading, sorting, aerating, cooling, drying, sifting, separating, proportioning, formulating. Use it for all types of materials—dry, hot, dusty, lumpy, abrasive, etc. Reduces maintenance and labor costs; increases production.

Only the new
ERIEZ HI-VI VIBRATORY FEEDER
gives you all these important features:

ERIEZ HI-VI VIBRATORY EQUIPMENT

Magnetic SEPARATION AUTOMATION VIBRATION Equipment

PAT. PEND.

Totally enclosed, exclusive patented electro-permanent magnetic drive element with lifetime-powered Alnico V magnet • Drive element is dust- and moisture-resistant • Durable, glass fiber springs are rustproof; won't pack • Greater capacity than comparable size units • Greater stability • Superior control; full feed or dribble feed for materials ranging in density from 40 to 150 lbs. per cu. ft. • All units tested and stabilized at factory.

Interesting literature tells all about the complete Eriez line. Send for it.

write ERIEZ MFG. CO.
73 EA Magnet Dr., Erie, Pa.

Check 5378 opposite last page

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Send Specifications for an estimate. Department 27

WIRE PRODUCTS since 1880

THE C. O. JELLIFF MANUFACTURING CORP.
SOUTHPORT • CONNECTICUT • USA

Check 5379 opposite last page

NEW LITERATURE

For corrosion studies or pressure readings

Access fittings that permit ready entry to pressure vessels, manifolds, or pipelines without shutting down unit are described in 32-page catalog. Corrosion studies or pressure readings can be made safely with the fittings. Plugs may be installed or removed under pressure. Cat C-58 — Cosasco Div., Perfect Circle Corp., 11655 McBean Dr., El Monte, Calif.

Check 5380 opposite last page.

For oil chemistry lab

Bulletin of four pages lists a selection of equipment for oil chemistry laboratory. Most items are designed to meet specifications published by American Oil Chemists' Society. Oil chem lab equip Bul — Arthur S. LaPine & Company, 6001 South Knox Ave., Chicago 29, Ill.

Check 5381 opposite last page.

Neutron radiation

"Protection against Neutron Radiation up to 30 Million Electron Volts" is subject of 88-page handbook featuring 10 tables and 17 illustrations. List of further references in field is appended. To obtain National Bureau of Standards' Handbook 63, remit 40c direct to Superintendent of Documents, US Government Printing Office, Washington 25, D. C.

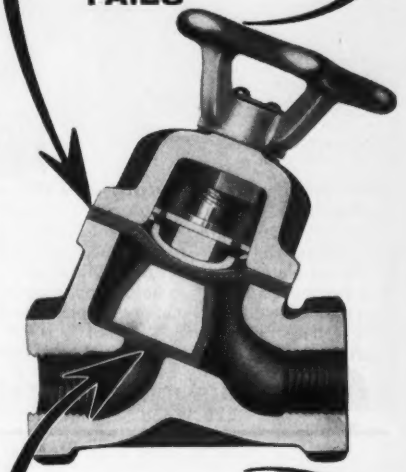
Weather-protected motors

Bulletin of six pages describes weather-protected motors with enclosures built to NEMA Type II standards to meet every requirement of outdoor service. Construction and mechanical features available in all commonly used ratings, both horizontal and vertical, 250 hp and above, are presented. Bul 05B7874C — Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Check 5382 opposite last page.

CLOSES TIGHT *regardless*

EVEN IF THIS DIAPHRAGM FAILS



THIS DISC MAKES CLOSURE POSITIVE - SURE

With Rockwell "D-D" Diaphragm Valves, you don't depend on the diaphragm to seal and shut-off fluid flow. This is done by the tight seating disc which will always close even should the diaphragm rupture in corrosive, abrasive, vacuum or other service.

The diaphragm serves a single purpose: to seal the valve's operating mechanism. It can be replaced without removing the valve from the line.

Rockwell "D-D" Valves provide other advantages: low closing torque; low pressure drop; high capacity; minimum maintenance. Available with lined and unlined bodies; flanged, threaded or with union ends. Get Bulletin 800.

***You're SURE - You're SAFE with* ROCKWELL "D-D" VALVES**

W. S. ROCKWELL COMPANY
2208 ELIOT STREET
FAIRFIELD, CONN.

Check 5383 opposite last page

New Rotary Joint for Water Service

APPROXIMATELY ACTUAL SIZE

Smaller in Size, Weight and Price

Fits close quarters, tough service conditions on printing presses, calenders, waxers, embossers, ball mills, etc. No packing, no lubrication or adjustment, no external supports. Nickel-plated to resist rust, friction, wear. New special process makes seal rings harder, denser. Only 4 internal parts for easy field servicing. For all high speed service, pressures to 150 lbs. Six sizes: ⅜", ½" and ¾" N.P.T. or ⅜", ¾" and ⅞" N.F. Machine threads. **Write for catalog information on new 4000 series.**

THE JOHNSON CORPORATION
826 Wood St., Three Rivers, Michigan

Check 5384 opposite last page

BETTER PERFORMANCE

• *Less slippage*
• *Longer life*

Try Darcova Pumcups in your reciprocating pumps and cylinders, and you too will realize what a *big* difference they make.

Because they are "engineered" for their job—in precisely controlled textures, shapes and types—and are noted for outlasting other packings at least 3 to 1! Why not get the advantage of this tremendous saving in maintenance and down-time?

Pumcup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder requirements.

Get all the facts

Send today for helpful Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA
TRADE MARK
PUMCUPS

Check 5385 opposite last page

NEW LITERATURE

Gas analysis system

Data sheet of four pages describes manufacturer's magnetic O_2 system for flue gas analysis. Full-page display of recently installed system shows advantages. Data sheet 463-60 — Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia 44, Pa.

Check 5386 opposite last page.

Filters for electroplating

Economical concept of plating filtration allowing tank turnover of two or even three times per hour is discussed in manufacturer's four-page bulletin. Equipment is illustrated and described. Bul GEO-505 — Commercial Filters Corp., 2 Main St., Melrose, Massachusetts.

Check 5387 opposite last page.

Sealing problems?

Features and applications of manufacturer's mechanical seals in many styles to meet variety of sealing jobs were variety of sealing jobs are discussed in Folder Ad-164 — The Garlock Packing Company, Palmyra, N. Y.

Check 5318 opposite last page.

Teflon tape info

Manufacturer's folder presents information on Teflon tape which includes physical characteristics, methods used in taping, standard packaging, and sintering process. Teflon tape bul — Bonny Mfg. Corporation, 340 Auburn St., Auburndale 66, Mass.

Check 5388 opposite last page.

Specialty items listed

Catalog of 12 pages lists colors, essential oils, flavors, and other specialty items. Price List, Jan 1958 — Fritzsche Brothers, Inc., 76 Ninth Ave., New York 11, N.Y.

Check 5389 opposite last page.

The Smart Trend in

PVA EXTENDERS

Tamms GOLD BOND R. SILICA

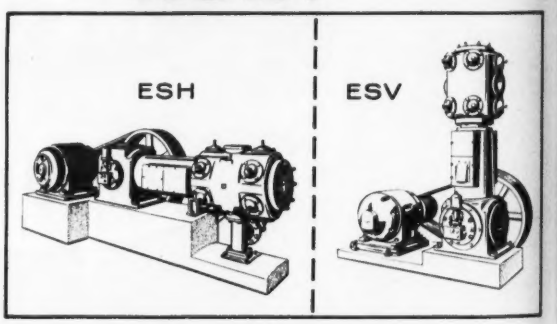
A functional extender pigment especially adapted to PVA formulation for scrubability, leveling and flat sheen. It is easily wetted and dispersable. pH of 6.5–6.8. Non-crystalline structure. Economical in cost.

TAMMS INDUSTRIES CO.
RM-30, 228 N. LA SALLE ST., CHICAGO 1, ILL.

Check 5390 opposite last page

AIR COMPRESSORS

New!



These two new Ingersoll-Rand heavy-duty compressors are actually the same unit, built in either horizontal or vertical arrangement. This brand-new design features completely sealed frame, full-floating aluminum bearings, I-R Type A Channel Valves, and precision-machined running parts which never need fitting or adjustment. Sizes 20 to 150 hp, wide range of pressures, for any air or gas service. Write for more information.

Ingersoll-Rand
I-816 11 Broadway, New York 4, N.Y.

OVER 1000 COMPRESSOR TYPES AND SIZES...FROM 1/2 TO 7500 HORSEPOWER

Check 5391 opposite last page

as easy as stacking coins

Hackney chemical containers stack four high...save shipping, handling and storage costs

Here's the lightweight, stainless steel acid container that builds a safe, compact stack — saves warehouse space and handling time for you. Bottom foot ring of the 15½-gallon Hackney chemical container fits snugly over top ring of lower barrel.

Designed with easy-to-grasp, full curled foot rings for safe, one-man handling and convenient pouring. Your name can be embossed on the bottom ring. Low tare weight reduces transportation costs. Stainless steel protects your dangerous or corrosive chemical products — eliminates breakage losses.

These 15½-gallon containers are just one of the many types and sizes of returnable shipping containers that bear the famous Hackney name. Write today for the complete Hackney Drum and Barrel Catalog.

Pressed Steel Tank Company

Manufacturer of Hackney Products

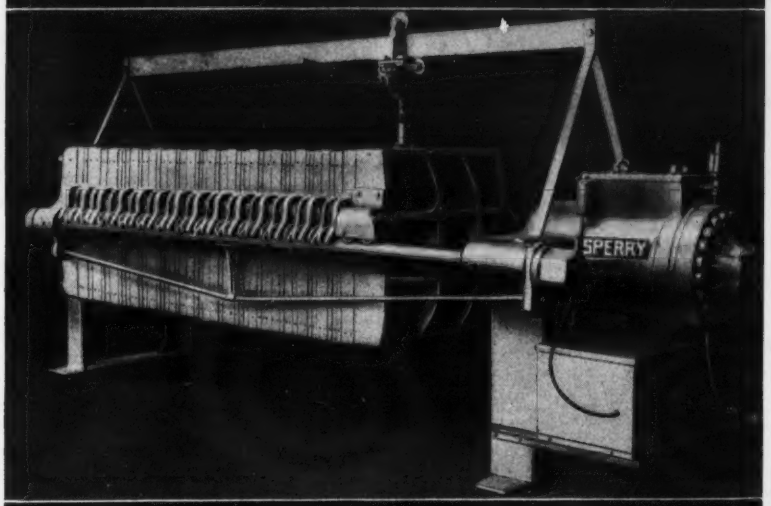
1463 South 66th Street, Milwaukee 14, Wisconsin

Branch offices in principal cities

CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

Check 5392 opposite last page

LOW DOWNTIME



with a plate and frame SPERRY FILTER PRESS

If your present filter system is inadequate to meet increased production demands . . . if excessive shutdowns, cleaning and manpower problems are dragging out your filter cycle so as to slow down your production cycle — now is the time to investigate all the advantages of a plate and frame filter press — as modernized and custom engineered to your particular application by D. R. Sperry & Company.

Through extreme versatility of design, a Sperry Filter Press can simplify the most complex filtration requirements. Varying batch sizes . . . incompatible products . . . cake removal . . . and constant cleaning cease to be problems. Instead — the cycle is reduced . . . filtering area and pressures are increased . . . downtime losses are reduced to a minimum . . . and with labor-saving automatic closing attachments and plate shifting devices, complete control is reduced to a one man operation.

Sperry Filter Presses are available in a design and capacity to handle any filterable mixture and any filter material . . . with center, side or corner feed; open or closed delivery; high or low temperature control; and your choice of labor saving devices.

FOR A LOW-COST ANSWER TO YOUR FILTRATION PROBLEMS, SEE THIS SPERRY CATALOG . . .
an up-to-date fully illustrated reference manual of erection, operating, design and construction data and specifications. Mail coupon for your free copy today.

D. R. SPERRY & CO.,
BATAVIA, ILLINOIS

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D. R. SPERRY & COMPANY
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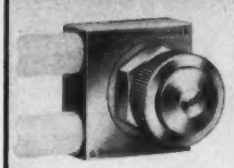
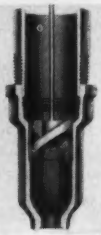
SPRAY NOZZLES ...THAT FIT INSTALLATION NEEDS



LIMITED SPACE? Here's a pneumatic atomizing nozzle no bigger than a half dollar.



NOZZLES INACCESSABLE? Vane of this FullJet nozzle is withdrawn through pipe for easy, remote cleaning.

SIMPLIFIED WALL MOUNTING? Nozzle body acts as flange . . . fits any wall thickness. Perfect for pressurized chambers. →

Spraying Systems gives you better spray nozzle performance . . . plus a wide choice of physical nozzle shapes, sizes and assemblies. Shown here are three such typical nozzles. When the spray nozzle problem also includes installation and maintenance, perhaps we already have an easy solution. For information write for Catalog 24.

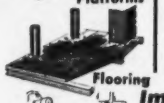
SPRAYING SYSTEMS CO.
3216 RANDOLPH STREET
BELLWOOD, ILLINOIS

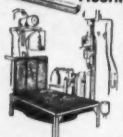
Check 5394 opposite last page

FOR MAXIMUM SAFETY all over your plant use Safety GRIP-STRUT

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Work Platforms


Flooring



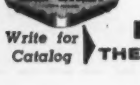
Important Safety Features

★ Fire proof
★ Slip proof
★ Maximum strength
★ Minimum weight
★ Easy to stand on
★ Cool in summer — warm in winter

Big Economy Features

Machine Guards

★ For balconies—no extra light needed below—no extra heat.
★ No extra supports necessary—channels are integral part of the material
★ No secondary sprinkler heads needed
★ Self-cleaning
★ Cut and installed like lumber by your own maintenance force
★ Low in original cost


Balconies

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."

Write for Catalog

PRODUCTS DIVISION
THE GLOBE COMPANY • *Manufacturers since 1914*
4006 S. PRINCETON AVE. • CHICAGO 9, ILL.

Check 5395 opposite last page

NEW LITERATURE

Screen selection guide

Manufacturer of screens for separations from 12 inches to 325 mesh offers valuable guide containing screen selection information. Screen Selection Guide 26C6177M — Industrial Equipment Div., Allis-Chalmers Mfg. Company, Milwaukee 1, Wis.

Check 5222 opposite last page.

Plastics color matching

Booklet of 20 pages explains process of how plastics are color matched to other materials. "Tenite Plastics Views" —Eastman Chemical Products, Inc., subs. of Eastman Kodak Co., 260 Madison Ave., New York 16, New York.

Check 5396 opposite last page.

Boiler control systems

Boiler feed water control system and integrated control system for gas-fired boiler are detailed in separate data sheets. Data sheet 823-1 (feed water control system) and 823-21 (gas-fired boiler control) — The Foxboro Company, Foxboro, Mass.

Check 5397 opposite last page.

Easier lifting, moving

Bulletin of four pages contains specifications and illustrations of advanced features and operating views of manufacturer's recently developed hydraulic hand lift trucks. Bul 572 — Barrett-Cravens Company, 628 Dundee Rd., Northbrook, Illinois.

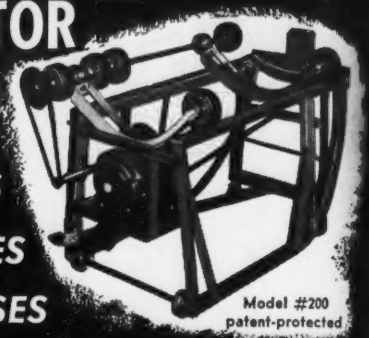
Check 5398 opposite last page.

Filter paper uses

Manufacturer's catalog shows uses of industrial filter papers in plant applications and illustrates various sizes and shapes available. Cat 357 — The Eaton-Dikeman Company, Filtertown, Mt. Holly Springs, Pennsylvania.

Check 5299 opposite last page.

inexpensive MORSE portable ROTATOR



- MIXES
- BLENDS
- TUMBLES
- CLEANSES

Model #200 patent-protected

In 30 to 55 gal. drums, 1 to 5 gal. cans at rotating speeds 10 to 40 rpm. The four drive-wheels have Neoprene treads, resistant to paint and oil. The idler wheels have Torrington Needle Bearings for smoother operation. Easily loaded—frame has retractable casters. Various speeds are secured through chain sprocket reduction. Morse Model #200 Rotator weighs 115 lb.

Write for free bulletin and catalog, showing complete Morse line of Drum and Barrel Handling Equipment.

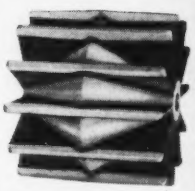
MORSE MANUFACTURING CO., INC.
757 West Manlius St. East Syracuse, N. Y.

Check 5399 opposite last page

DESIGNED TO CUT BELT COSTS

SPROUT-WALDRON

BELT-SAVER PULLEYS



Write for Bulletin 33-C

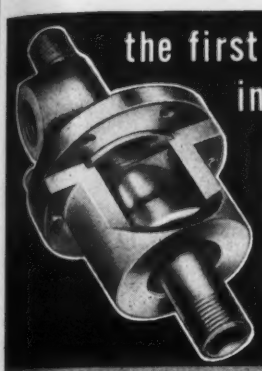
The life of conveying belts can be increased from 50% to 400% with unique Belt-Saver Pulleys in installations handling sharp lumps and abrasive materials. Such materials slide away from the pulleys because of the special cone and wing design so belts cannot be damaged. For applications ranging from the handling of stone and gravel to wood chips and foundry sand, Belt-Savers are big money savers.

Sprout-Waldron also offers a full line of cast-iron pulleys for transmission and conveyer use that provide top economies. Write for details.

IN/500

SPROUT-WALDRON
Manufacturing Engineers Since 1866
LOGAN STREET • MUNCY, PA.
EQUIPMENT FOR SIZE REDUCTION—MIXING & BLENDING — BULK MATERIALS HANDLING — PELLETING & CUBING — PRODUCT CLASSIFICATION

Check 5400 opposite last page



the first REAL ADVANCE in **Freeze proof**

ROTARY JOINTS!

PACKLESS
SELF LUBRICATING
GUARANTEED LEAK PROOF

Phillips Exacto is not just another rotary joint but a complete new exclusive design guaranteed to eliminate "seizing or freezing on the roll." It operates at steam pressure up to 250 p.s.i. with temperatures up to 500° F. and speeds to 1,000 r.p.m.

Flexible Self-Aligning feature permits easy installation. Minimum turning torque and unique internal pressure relief design gives uninterrupted service with added savings in horse power. Available in both TF and S types, **PHILLIPS EXACTO** is stocked in sizes ¼" through 2".

Performance test a pair of **PHILLIPS ROTARY JOINTS** in your own plant on a 60 day free trial basis. Prove to yourself the amazing results other manufacturers have had with this new Joint.

PHILLIPS **EXACTO*** ROTARY JOINTS *Pat. Pending

PHILLIPS COMPANY INC.
5711-F Boulevard East, West New York, N. J.

Check 5401 opposite last page

What's
A "New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

NEW LITERATURE

Permanent plate magnet

Bulletin of eight pages points out features of company's permanent plate magnet, shows how to choose right magnet for your system, and presents specifications on single-row and double-row plate magnets. Bul 1071 — Stearns Magnetic Products, Milwaukee 46, Wis.

Check 5402 opposite last page.

Handy paper selector

Convenient slide rule form of handy paper selector permits easy determination of type of paper best suited to meet individual multiwall bag packaging requirements. Paper selector — St. Regis Paper Company, 150 East 42nd St., New York 17, N. Y.

Check 5403 opposite last page.

Lists organic chemicals

Catalog of eight pages presents description data on intermediates, plasticizers, and solvents. "Organic Chemicals 1957/1958" — Chemical Div., Celanese Corporation of America, 180 Madison Ave., New York 16, N.Y.

Check 5404 opposite last page.

Acid-proof tank lining

Properties and use, as well as specifications, instructions, and application data on acid-proof tank lining, are presented in eight-page "Pyroflex" Bul — Maurice A. Knight Company, 171 Kelly Ave., Akron 9, Ohio.

Check 5405 opposite last page.

About customer service

Manufacturer's catalog provides complete information on fully equipped research center for pretesting customer's evaporating process. Cat 381 — Buflovak Equipment Div., Blaw-Knox Company, 1645 Fillmore Ave., Buffalo 11, New York.

Check 5298 opposite last page.

Patent No. 2,722,372. Other Patents Pending.

THE WORLD'S MOST EFFICIENT POWER EXHAUSTER FOR INDUSTRY

. . . **FOR INSTITUTIONS**

. . . **FOR RESIDENCES**

★ **STATIC PRESSURE UP TO 20 INCHES**
★ **NO MOTORS, FANS OR BEARINGS IN EXHAUST LINE**
★ **NEEDS NO STACKS** ★ **ACID RESISTING FINISHES**

FOR INDUSTRY, Quickdraft provides up to 20 inches static pressure to **exhaust** paint spray, abrasives, corrosive gases, noxious fumes and high temperatures . . . **move** grains, powders, salts and trimmings . . . **recover** metallic waste from foundry stacks. It reduces maintenance costs . . . eliminates down-time for cleaning and replacing fan blades.

For INSTITUTIONAL AND COMMERCIAL BUILDINGS, Quickdraft eliminates costly, tall and unsightly stacks. It vents incinerators, heating plants and water heaters at roof level . . . safely and efficiently.

For RESIDENCES, Quickdraft maintains constant draft for efficient and economical combustion of all fuels. It keeps chimneys dry. It eliminates pulsating or chattering, puffing, smoking and sooting.

Write for QUICKDRAFT ENGINEERING DATA on your application . . . today.

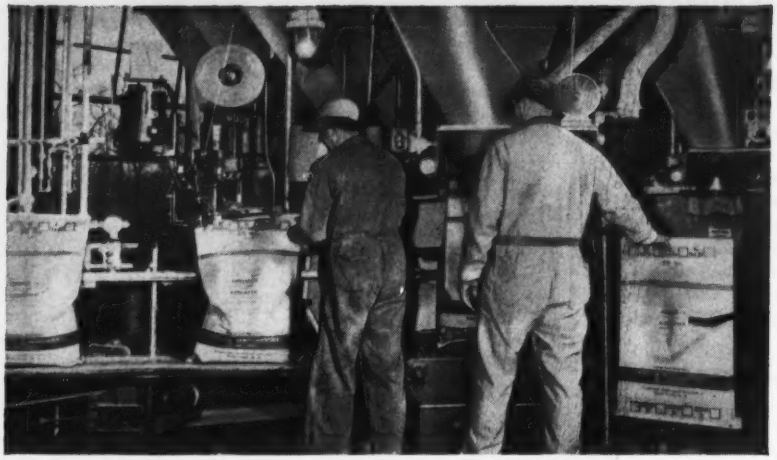
N-587-QD

IMPORTANT NOTICE
For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel. No. 316 Stainless Steel, rigid plastics (P.V.C.), and with plastic and Fiberglas coatings.

Quickdraft CORPORATION

P. O. Box 87-Q
Dueber Hampden Bldg.
Canton 1, Ohio

Check 5406 opposite last page



Richardson recommends 4 WAYS TO SAVE WASTED BAGGING DOLLARS

1. **Minimize Weight Give-Away.** Frequently, you're forced to set mean bagging weights high, to prevent falling short. With an inaccurate scale, you can lose more than $10 an hour through weight variations—especially when bagging at high speeds. Many processors have solved this problem by installing Richardson bagging scales. With average accuracy of ± 1 to 2 oz. or better, they prevent overweights and underweights, year after year.
2. **Spend Less for Bags.** You may be paying good money for nothing but "air space" in filled bags. A Richardson G-73 Impacker can end this waste. The Impacker is a simple, compact accessory that quickly "shakes down" material as it fills bags. Thus, you can pack any given quantity into smaller, neater bags. The money you save—on bag size alone—can bring you profits well beyond the cost of this equipment.
3. **Speed Up Production.** Example: the Duplex Richardson E-50 Bagging Scale can turn out twenty 100-lb. bags per minute. It's only one of many Richardson models for handling flour, sugar, rice, feed, and chemicals, in bagging ranges of 25-250 lbs.
4. **Cut Excessive Labor Costs.** Are your bagging operations overmanned? Some installations require expensive standby labor. You can cut out this cost—sometimes as much as one-third of regular labor costs—and free labor for productive work, by installing *automatic* Richardson bagging equipment. Time and labor-saving accessories include automatic feeders, sewing conveyors and pedestals, bag-holders, as well as packers like the Impacker described above. Low-cost automatic proportioning systems are Richardson specialties, too. Simple design makes maintenance easy. Any maintenance man can understand a Richardson. And, *only* Richardson maintains a nationwide service organization that can serve you *within 24 hours,* if necessary.

Richardson Scales conform to U. S. Weights and Measures H-44 for your protection.

FOR MORE INFORMATION ON RICHARDSON BAGGING SCALES, WRITE TODAY TO

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY • CLIFTON, NEW JERSEY

Sales and Service Branches in Principal Cities

Also manufactured in Europe to U.S. standards

1206

Check 5407 opposite last page

NEW LITERATURE

Calcium carbonates

Broad range of properties are obtainable with precipitated calcium carbonates, when used as fillers in neoprenes. 11-page bulletin tells all. $CaCO_3$ tech bul — Diamond Alkali Company, 300 Union Commerce Bldg., Cleveland 14, Ohio.

Check 5408 opposite last page.

Describes seals

Designed to protect pressure instruments against corrosion and clogging, manufacturer's diaphragm seals are described in Bul 250 — Brooks Rotameter Company, PO Box 432, Lansdale, Pa.

Check 5409 opposite last page.

About dust collectors

Company's line of wet- and dry-type dust collectors and auxiliary equipment are described and illustrated in Bul A-9157 — The Ducon Company, Inc., 147 East Second St., Mineola L. I., N. Y.

Check 5410 opposite last page.

Wells for thermostat

Two-page catalog contains specifications on wells for thermostat applications in fluids, gases, or high-pressure environments. Copper and stainless steel designs suitable both for immersion and surface mounting are described. Thermal wells cat — Fenwal Incorporated, Pleasant St., Ashland, Mass.

Check 5411 opposite last page.

Describes lift truck

Design, construction, and operating features of manufacturer's compact 4000-lb capacity lift truck are described in four-page folder. Tables, drawings, and diagrams depict specifications. Model 460 Bul — Towmotor Corporation, 1226 East 152nd St., Cleveland 10, Ohio.

Check 5412 opposite last page.

for truly

AUTOMATED

SPEED CONTROL

Where automation performance depends on accurate speed control.

Get mechanical drive accuracy and range with electrical control flexibility at lower cost.

Graham

most reliable variable speed drive made

Greater accuracy of speed setting and holding on open loop control — wider range and faster response for closed loop systems.

CONTROL SPEED in ADJUSTABLE PROPORTION to:

1. POTENTIOMETER SETTING or RECORDER SLIDEWIRE
2. .5 to 5 ma or any TRANSDUCER SIGNAL
3. 3 to 15 PSI AIR SIGNAL
4. PARALLEL BINARY SIGNAL from PUNCH CARDS, TAPES, COMPUTERS or BINARY TRANSDUCERS
5. VARIABLE FREQUENCY SIGNAL

- **UNLIMITED SPEED RANGE**
- **UNMATCHED ACCURACY**
- **ULTIMATE SIMPLICITY and COMPACTNESS**
- **NO BELTS OR TUBES**
- **LOW COST**

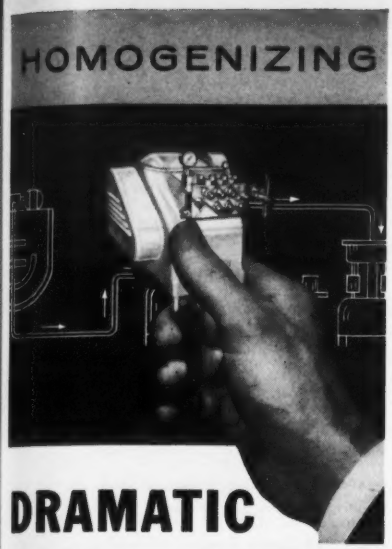
SEE OUR CATALOG IN SWEET'S PRODUCT DESIGN FILE OR WRITE FOR COPY

ENTIRE UNIT EXPLOSION PROOF, if desired.

GRAHAM TRANSMISSIONS, INC.

Dept. C P, Menomonee Falls, Wis.

Check 5413 opposite last page



DRAMATIC MONEY-SAVING APPROACH TO

Blending, Dispersing, Emulsifying

Gaulin *Particle Control* . . . plus GTA . . . gives you the *right* answer on the most inexpensive method to disperse, emulsify or blend your product.

- Homogenizers in GTA Bulletin H-55.
- Sub-Micron Dispersers in GTA Bulletin SMD-55.
- RE® Colloid Mills in GTA Bulletin C-57.
- Laboratory Homogenizers in GTA Bulletin LH-55.

GTA shows how to: Improve uniformity; stop separation; accent taste; improve texture; speed chemical reactions; reduce amount of materials needed; and easily control and duplicate your product.

It's easy to try Particle Control. Rent a Gaulin Laboratory Homogenizer or Colloid Mill for only $75.00 a month and see how your product can be made better, faster and cheaper.

Some Typical Applications of GTA

Wax emulsions	Leather finish
Resin emulsions	Carbon black dispersion
Pigment dispersion	Vinyl-pigment dispersions
Adhesives	Grease and petroleum production
Fat emulsions	Suspensions
Experimental coating colors	Cosmetic and hand cream blending
Chemical reactions	Soap processing
Pharmaceuticals	Latex compounding
Dope dyeing	
Light ink dispersions	

Gaulin TRADE MARK

MANTON Gaulin MANUFACTURING CO., INC. EVERETT, MASS.

Manton-Gaulin Manufacturing Co., Inc.
55 Garden Street, Everett 49, Mass.
World's largest manufacturers of high pressure pumps, homogenizers and colloid mills.

Check 5414 opposite last page

Leasing Equipment

From page 40

tested expedient to accomplish the end desired.

Still other companies hold a tight checkrein on capital expenditures and financial ratios, although the president or division manager may believe it mandatory that certain new equipment or facilities be installed. Even if the equipment is purchased on a credit plan, it decreases the ability of the concern to borrow in other directions. The leasing of a fixed asset has a similar effect but only to the much smaller extent of the annual rental. As a result, leasing meets the problem of the tight checkrein on capital spending or financial ratios — without forcing the board of directors to raise more capital.

Rapid Obsolescence

Again, some companies do not like to face the problem of large investment in equipment when there are strong possibilities of rapid obsolescence. The risk of early or unexpected obsolescence of chemical processing equipment is a difficult contingency to evaluate. For example, new high-speed grinding mills come on the market every year. Newer-type reactors become available, and so forth. These are small matters, but a new chemical process could cause an entire distillation unit, for example, or an entire plant to become obsolete.

When and if a sudden technological advance occurs, the company with outdated equipment may or may not suffer a distinct loss depending on how tight competition is and how much difference the new equipment can make in production costs.

Investment By-pass

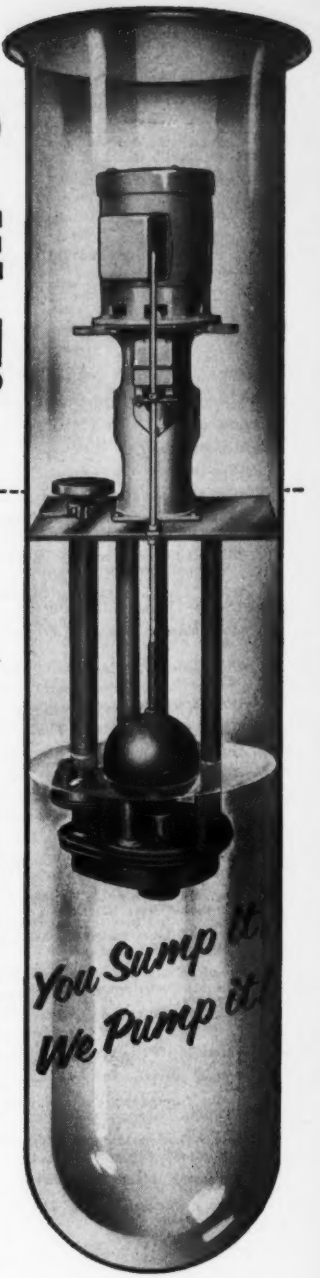
However, under the circumstances, leasing offers a means for a company to by-pass a large investment in equipment which might soon become obsolete.

By the same token, leasing enables a user to acquire the latest and the best on a short-term basis.

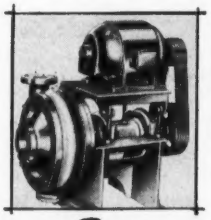
To page 234

STANDS UP UNDER THE ACID TEST!

GALIGHER ACID PROOF SUMP PUMP



Acid or *Caustic* solutions and slurries containing up to 60% solids and *froth* or *foam* are constantly handled on a daily basis by the Galigher Sump Pump, designed for heavy duty corrosive service in the chemical industry. The Galigher Sump Pump is available in natural or synthetic rubber, plastic covering, hard iron or stainless steel. 10 to 500 gpm. capacity, 5 to 100 ft. head in various sizes, direct and V-drives. Noteworthy features include no mechanical seals, no packing, no submerged bearings, double suction thrustless design which lightens bearing load. The Galigher Sump Pump *will not* air lock. All this means greater performance, dependability and long, trouble free life.



The VACSEAL PUMP Precision engineered for rugged use. Exclusive impeller design eliminates gland water.

BULLETINS ON REQUEST . . . Distributors in Industrial centers of U.S. and Foreign Countries.

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the GALIGHER co.

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HOME OFFICE: 545 585 W. 8th South P. O. Box 209 Salt Lake City 10, Utah

EASTERN OFFICE: 921 Bergen Ave. (Room 721) Jersey City 6, New Jersey

GALIGHER PRODUCTS: AGITAIR® Flotation Machine, VACSEAL Pump, Geary-Jennings Sampler, Acid-proof Sump Pump, Geary Reagent Feeder, Laboratory AGITAIR® Flotation Machine, Laboratory Pressure Filter, Laboratory Ball Mill, Rubber Lined and Covered Products, Plastic Fabrication.

SP-502

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Leasing Equipment

From page 231

The whole problem of inflation has begun to cause some soul-searching in corporate treasurers' offices. For many years, corporations have thought nothing of renting real property, but yet insisted on purchasing machinery and equipment. Due to inflationary pressures, industrial real estate has not only held its value in most instances, but actually has been enhanced. Machinery and equipment, on the other hand, must always depreciate in value as it wears out.

If the corporation expected to spend two million dollars on plant and an equal amount on equipment, might that company be wiser to own its real property and lease the equipment? Many corporations are finding that the high toll of inflation is causing them to readjust their thinking as to which assets should be purchased and which leased.

Business Liquidity

Finally, the desire to maintain business liquidity has led many companies to lease rather than buy. In the industrial chemicals manufacturing business, the ratio of "quick" assets to current liabilities dropped from 2.68 in the middle of 1954 to 2.40 in the middle of 1957.

This decline in liquidity is, in part, due to the impact of federal tax legislation providing for a speed-up of corporate tax payments. In part, it is also due to the greater demand for credit by business customers.

The upshot is that many manufacturers in this industry have turned to leasing, thereby conserving working capital. True, the situation may not affect all companies in the field but it evidently affects enough to make the trend marked. It may even be possible to make a forecast. Leasing should become increasingly important in industries whose ratio of fixed assets to tangible net worth is at least 30%. In the industrial chemical industry, this ratio is now 55%. The possible results are obvious.

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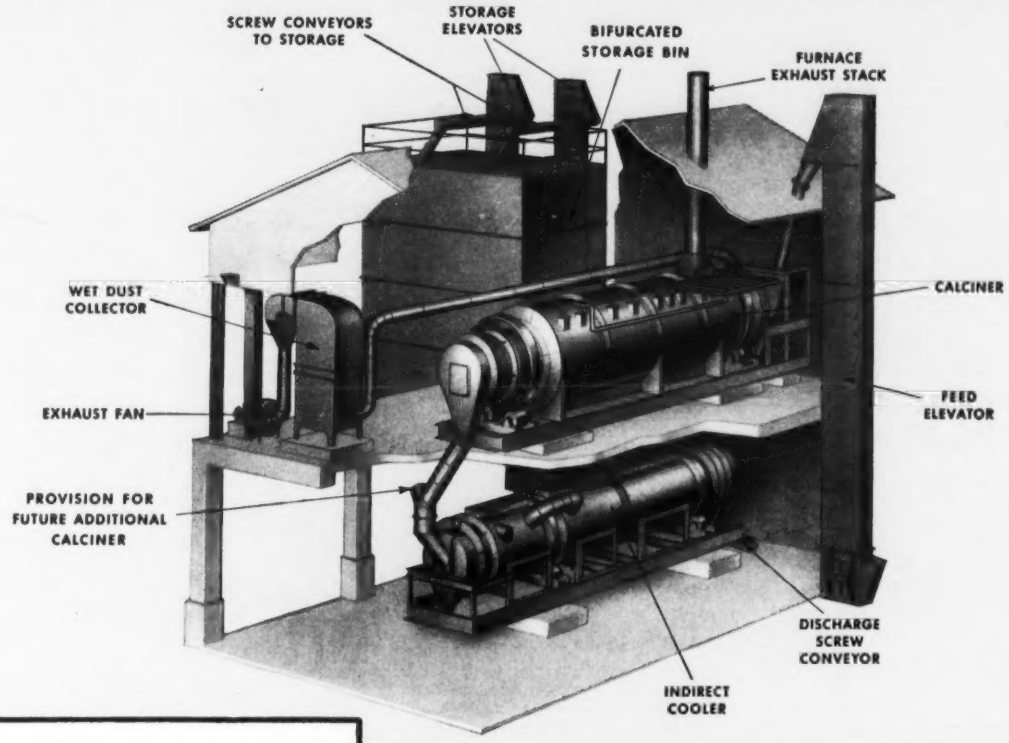

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Finely ground manganese ore mixed with coal or coke is fed into the alloy tube of the gas fired calciner (provision made for second unit) and heated to about 1850° F. The carbonaceous material produces a reducing atmosphere changing the ore to MnO. The calcined material is discharged to an indirect water spray type cooler located on the floor below, which is sealed, and has the same atmosphere as the calciner. The cooled material is then elevated to storage. Exhaust gases pass through a Bartlett-Snow nozzle spray type wet dust collector.

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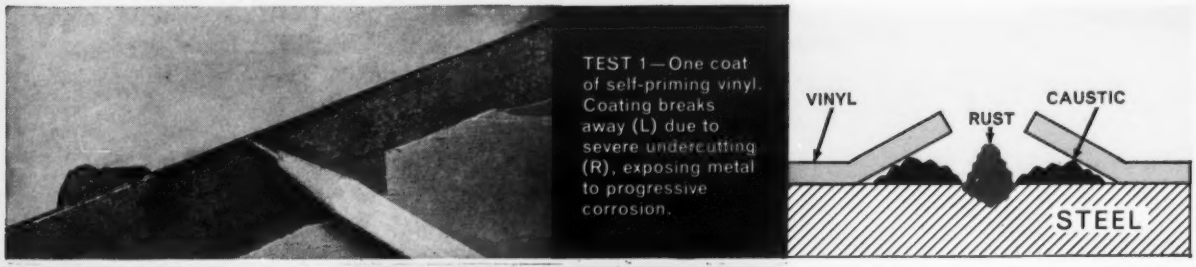
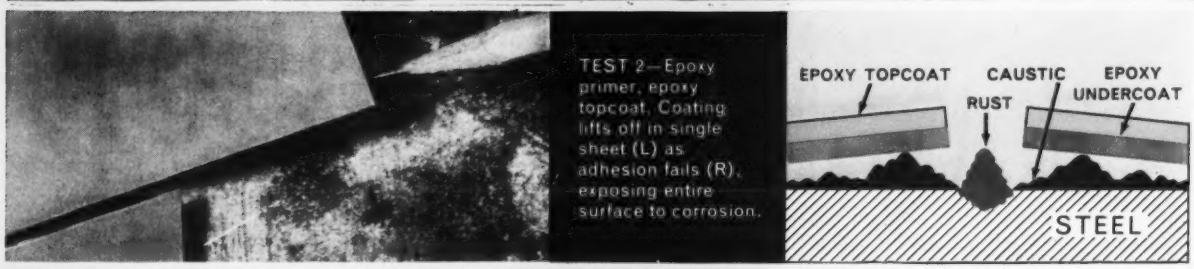
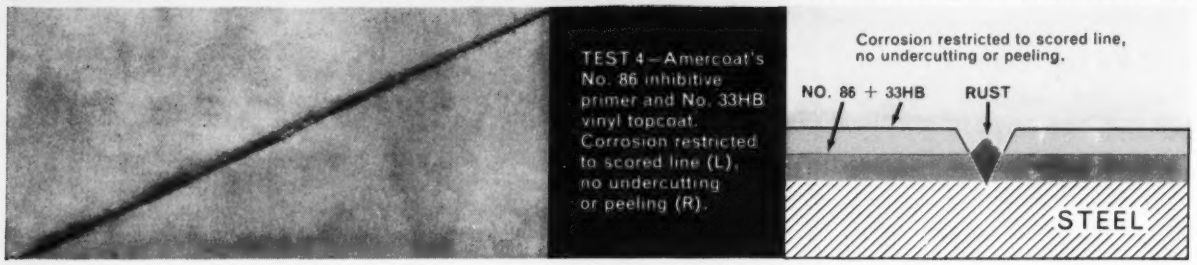
PUZZLED ABOUT PRIMERS?

Here are tests you can duplicate


TEST 1—One coat of self-priming vinyl. Coating breaks away (L) due to severe undercutting (R), exposing metal to progressive corrosion.
VINYL
RUST
CAUSTIC
STEEL


TEST 2—Epoxy primer, epoxy topcoat. Coating lifts off in single sheet (L) as adhesion fails (R), exposing entire surface to corrosion.
EPOXY TOPCOAT
CAUSTIC
RUST
EPOXY UNDERCOAT
STEEL

TEST 3—Oil primer, oil topcoat. Both coats fail completely (L) as underfilm caustic reacts on their oils to form soaps (R).
OIL BASE COATINGS SAPONIFIED
RUST
STEEL


TEST 4—Amercoat's No. 86 inhibitive primer and No. 33HB vinyl topcoat. Corrosion restricted to scored line (L), no undercutting or peeling (R).
Corrosion restricted to scored line, no undercutting or peeling.
NO. 86 + 33HB
RUST
STEEL

The purpose of these accelerated tests is to show what happens when various types of coatings are exposed to a typical corrosive environment. Four clean steel panels, free from mill scale and rust, were coated with different combinations of primers and topcoats. Each was scribed to bare metal and immersed in salt water in the presence of free oxygen, for two weeks.

As caustic deposits formed over cathodic areas of the steel in tests 1, 2 and 3, failure occurred in three ways. The vinyl, though not directly attacked, was undercut as caustic spread beneath the film and destroyed adhesion. The epoxy coating, known for critical adhesion to smooth metal, proved impervious to caustic attack. It was, however, lifted in its entirety as moisture spread beneath the surface. The entire oil paint film was quickly penetrated by the salt solution, creating widespread corrosion and caustic formation. The caustic then reacted with the oil to saponify the film.

In the fourth test the corrosion was limited to the score mark. Reason: Amercoat No. 86 Primer resists undercutting and adheres tenaciously, inhibiting electrolytic corrosive action.

The conclusions are clear. To provide long term protection in corrosive service, start with Amercoat No. 86 Primer, which provides a sound and lasting base for quality topcoats such as Amercoat No. 33HB.

Write today for complete data on Amercoat No. 86, and have the details on hand when planning your next important coating job.

Amercoat CORPORATION

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